

Coopers
& Lybrand
Consulting

**Alberta Economic
Development And Tourism**

Manufacturing In Alberta

September 18, 1996

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EXECUTIVE SUMMARY - MANUFACTURING IN ALBERTA COOPERS AND LYBRAND CONSULTING (SEPT. 18, 1996)

- Manufacturing is one of the fastest employment growth sectors in Alberta and accounts for 40% of all new jobs created in Alberta (last 12 months). Alberta's manufacturing shipments of \$26.9 billion were the fastest growing of all the Western Canadian provinces between 1988 and 1995 at a rate of 50% (B.C. recorded \$33.4 billion in 1995, a 31.1% growth over the same period).
- A number of Alberta's industrial products manufacturing sectors have experienced significant increases. Alberta's overall "up and comers" for 1995 are electrical and electronic products and machinery industries (leading the Western Canadian provinces in terms of manufacturing shipments, and also experiencing exceptionally high growth in manufacturing shipments and value added). Industrial products include electrical, transportation equipment, machinery, fabricated metal products, plastics, primary metal products (pipeline equipment), etc.
- Industrial products manufacturing (or non-resource manufacturing industries) represent 31% of the Province's total manufacturing shipments and 43% of total manufacturing value added.
- Alberta's manufacturing base has tripled since 1970 (real value of shipments). The top manufacturing industries according to 1995 shipments were food industries, chemical industries, refined petroleum and coal, pulp and paper, wood products, fabricated metal products and electrical and electronic products. Electrical/electronic and pulp and paper sectors are the two leading growth industries in the province .
- Alberta's manufacturing exports of \$10.5 billion in 1995 constitute almost 40% of Alberta's total merchandise exports (slightly less than that of mining, oil and gas combined).

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A number of Alberta's industrial products manufacturing sectors have expanded significantly in the last five years. Alberta's exports of industrial products have increased from \$1.1 billion in 1988 to \$2.1 billion in 1992.

1992 and 1993 saw significant growth in manufacturing and machinery industries (leading the Western Canadian provinces in terms of manufacturing shipments, and also experiencing exceptionally high growth in manufacturing shipments and value added). Industrial products include electrical, transport equipment, machinery, fabricated metal products, plastics, primary metal products, and other non-durable goods.

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**Alberta Economic
Development And Tourism**

Manufacturing In Alberta

September 18, 1996

Alberta's Primary Resource and Manufacturing Industry Performance
- Latest Available Statistics

| Industry Sector | Employment (1995) (000) | GDP (1994) (\$ millions) | Exports (1995) (\$ millions) | Investment (1995) (\$ millions) |
|-----------------------|----------------------------|-----------------------------|---------------------------------|------------------------------------|
| Manufacturing | 109.5 | 7,734.0 | 10,471.7 | 1,332.0 |
| % of total | 8.0% | 10.1% | 39.5% | 7.1% |
| Agriculture | 96.0 | 1,986.0 | 2,790.0 | 827.0 |
| % of total | 7.0% | 2.6% | 10.5% | 4.4% |
| Forestry | 5.5 | 415.0 | N/A | 56.0 |
| % of total | 0.4% | 0.5% | | 0.3% |
| Mining | 74.1 | 13,183.0 | 13,036.1 | 7,234.0 |
| % of total | 5.4% | 17.3% | 49.1% | 38.8% |
| All Industries | 1,373.2 | 76,289.0 | 26,543.6 | 18,646.0 |

Mining: Oil, gas, coal, sulphur, etc.

Forestry: Includes only logging and forestry services. Paper and allied products and wood products are included in manufacturing.

GDP: 1994 Gross domestic product at factor cost in current dollars

Investment: Private and public capital expenditures

Source: Preliminary data prepared by Alberta Economic Development and
Alberta Treasury based on Statistics Canada sources

Alberta's Manufacturing Employment Growth (000's)

| | August 1996 | August 1995 | August 1994 |
|---------------------------------|-------------|-------------|-------------|
| Manufacturing Employment | 126.9 | 113.4 | 105.6 |
| Net New Jobs | 13.5 | 7.8 | |
| Total Employment All Sectors | 1,439.5 | 1,406.9 | 1,371.1 |
| Net New Jobs | 32.6 | 35.8 | |

Source: Statistics Canada, Labour Force Survey

General Overview

The manufacturing sector is a major economic contributor to the Alberta economy. The facing table indicates manufacturing's significant contribution and shows how manufacturing stacks up against primary resource industries in Alberta.

Total manufacturing shipments in Alberta for 1995 were almost \$27 billion which is an increase of almost \$2 billion over 1994. In terms of the real value of shipments, Alberta's manufacturing base has tripled since 1970.

Alberta's GDP is made up of goods producing and service producing industries. In 1994, goods producing industries were estimated at about 41% of Alberta's GDP of \$76.3 billion. Manufacturing contributed \$7.7 billion or 10.1% of the 1994 GDP - almost 25% of the total goods producing industries.

Manufacturing industries directly employed approximately 109,500 people in 1995 or 8% of the labour force in Alberta - more than any of the primary resource industries. More importantly, the manufacturing sector has been one of the fastest growing sectors in terms of employment growth over the past two years. Manufacturing accounted for over 40% of all new jobs created in Alberta over the past 12 months, and just over 31% of all new jobs in the past 24 months (August 1994 - August 1996). Further, average weekly earnings for employees in manufacturing is generally substantially higher than earnings across other sectors.

Manufacturing is a consistent major contributor to capital investment activity, is a leader in terms of industrial research and development activity, and represents a significant portion of total exports. Manufacturing in Alberta comprised approximately 7.1% of total fixed investment activity in 1995 at just over \$1.3 billion. Manufacturing exports of \$10.5 billion in 1995 constitute almost 40% of Alberta's total merchandise exports, and are only slightly less than that of mining and oil and gas combined.

Overall Manufacturing Performance

Alberta manufacturing compares favourably to other Western provinces in all major groupings of manufacturing sectors. Based on 1995 Statistics Canada data, Alberta manufacturing shipments were \$26.9 billion, British Columbia \$33.3 billion, Manitoba \$7.7 billion

and Saskatchewan \$3.2 billion. Alberta's manufacturing shipments were the fastest growing in Western Canada between 1988 and 1995 at a rate of 50%.

Further, based on 1992 manufacturing shipments, of the Northwestern United States, only Washington (US \$72.9 billion) Oregon (US \$32.2 billion) and Colorado (US \$29.2 billion) have higher total manufacturing shipments than Alberta.

Manufacturing may be broadly defined as "all processes that transform and produce goods that add value in production". The Standard Industrial Classification system (SIC) classifies manufacturing along 22 different sectors and product types.

While resource-based manufacturing industries contributed greatly to the thriving manufacturing industry in Alberta, it is important to note the significant contribution of industrial/non-resource manufacturing industries.

- **Industrial/Non-Resource Manufacturing Industries** - The sectors not directly related to the resource industries or agriculture are a significant portion of Alberta's and the other Western provinces' manufacturing industry. These sectors include fabricated metals products, electrical and electronic products, machinery industries, primary metal industries, printing and publishing, non-metallic mineral products, plastic products, transportation equipment industries, furniture and fixtures, clothing and textiles, and other manufacturing industries.

In Alberta, the Non-Resource based sectors represent manufacturing shipments of \$8.3 billion or 31% of the Province's total.

- **Agriculture Processing Industries** - Alberta's food and beverage manufacturing shipments of \$5.9 billion leads the Western provinces. These sectors represent 22% of manufacturing shipments in Alberta.
- **Energy Based Manufacturing Industries** - Alberta dominates the Western provinces with refined petroleum and chemical products manufacturing shipments of \$8.7 billion. These sectors represent 32% of manufacturing shipments in Alberta and 12% of total manufacturing shipments for Western Canada.
- **Forest Product Manufacturing Industries** - While BC dominates in wood, paper and allied products at \$17.6 billion of manufacturing shipments (53% of its total), Alberta is second at \$3.9 billion. Alberta's growth between 1988 to 1995 was an impressive 175% as compared to BC at only 39%.

**Growth in Alberta Manufacturing Shipments
1988-1995 (See Notes)**

| Ranking | Industry | 1995 | 1988 | % Change |
|---------|---------------------------------------|-----------------|-----------------|--------------|
| 1 | Electrical Products | 1,298.0 | 344.3 | 277.0% |
| 2 | Paper & Allied Products | 2,339.9 | 631.0 | 270.8% |
| 3 | Wood Products | 1,595.5 | 797.7 | 100.0% |
| 4 | Transportation Equipment | 394.2 | 227.5 | 73.3% |
| 5 | Machinery | 1,189.0 | 761.4 | 56.2% |
| 6 | Fabricated Metal Products | 1,460.6 | 954.9 | 53.0% |
| 7 | Furniture & Fixtures | 327.5 | 217.4 | 50.6% |
| 8 | Chemical & Chemical Products | 4,972.7 | 3,442.6 | 44.4% |
| 9 | Plastic Products | 414.3 | 289.6 | 43.1% |
| 10 | Refined Petroleum & Coal Products | 3,777.0 | 2,876.4 | 31.3% |
| 11 | Food & Beverage | 5,900.2 | 4,508.9 | 30.9% |
| 12 | Other | 285.6 | 229.9 | 24.2% |
| 13 | Non-Metallic Mineral Products | 781.3 | 629.7 | 24.1% |
| 14 | Printing, Publishing & Allied | 896.9 | 733.9 | 22.2% |
| 15 | Clothing, Textiles & Leather Products | 234.8 | 228.9 | 2.6% |
| 16 | Primary Metal Products | 1,066.4 | 1,089.7 | -2.1% |
| | TOTAL | 26,933.9 | 17,963.8 | 49.9% |

 Highlighted cell indicates Alberta led the Western provinces for the sector

**Growth in Alberta Manufacturing Value Added
1988-1995 (See Notes)**

| Ranking | Industry | 1995 | 1988 | % Change |
|---------|---------------------------------------|----------------|----------------|--------------|
| 1 | Electrical Products | 387.1 | 169.3 | 128.6% |
| 2 | Other | 193.3 | 114.0 | 69.6% |
| 3 | Transportation Equipment | 193.6 | 115.5 | 67.6% |
| 4 | Furniture & Fixtures | 159.8 | 108.8 | 46.9% |
| 5 | Machinery | 529.1 | 370.3 | 42.9% |
| 6 | Paper & Allied Products | 483.0 | 344.0 | 40.4% |
| 7 | Food & Beverage | 1,395.4 | 1,016.5 | 37.3% |
| 8 | Fabricated Metal Products | 614.4 | 459.1 | 33.8% |
| 9 | Printing, Publishing & Allied | 585.0 | 443.8 | 31.8% |
| 10 | Non-Metallic Mineral Products | 438.8 | 342.8 | 28.0% |
| 11 | Plastic Products | 141.9 | 110.9 | 28.0% |
| 12 | Clothing, Textiles & Leather Products | 134.1 | 116.9 | 14.7% |
| 13 | Chemical & Chemical Products | 1,858.2 | 1,739.5 | 6.8% |
| 14 | Primary Metal Products | 268.9 | 358.7 | -25.0% |
| 15 | Refined Petroleum & Coal Products | 295.0 | 423.5 | -30.3% |
| | SUBTOTAL | 7,677.6 | 6,233.6 | 23.2% |
| 16 | Wood Products (Note 3) | 850.0 | N/A | |
| | TOTAL | 8,527.6 | | |

Source: Statistics Canada

NOTE 1: Actual data for manufacturing value added is not available beyond 1993. Manufacturing value added for 1995 is based on a linear trend of 1988 to 1993 data.

NOTE 2: For purposes of this table, clothing, textile products, primary textiles, and leather and allied products have been grouped.

NOTE 3: Wood products manufacturing value added is estimated based on 1993 data.

N/A Data not available

The Forest Product Manufacturing sectors represents 15% of Alberta's manufacturing shipments.

Sector Performance

The facing table outlines Alberta manufacturing shipments and manufacturing value added by sector for 1995 and 1988, and the growth (percent change) during this period. (Note: Actual manufacturing value added data was not available beyond 1993; 1995 amounts are based on a linear trend of 1988 to 1993 data). The table also highlights the sectors for which Alberta leads the Western provinces in terms of size and growth rates.

A number of the industrial/non-resource manufacturing sectors have experienced significant increases. The overall "up and comers" for 1995, based on the sector leading the Western provinces in terms of manufacturing shipments, and also experiencing exceptionally high growth in manufacturing shipments and value added, are electrical and electronic products and machinery industries.

In general, Alberta has a strong position in several sectors in manufacturing shipments, but manufacturing value added is an area for improvement for Alberta in certain sectors. For 1993, the most recent year that manufacturing value added data was available, Alberta's manufacturing shipments were 77% of BC's, but Alberta's manufacturing value added was only 66% of BC's total, indicating an opportunity for additional growth and development that should be analyzed in more depth.

Sector Highlights

Agricultural Processing Industries

The food and beverage industries accounted for \$5.9 billion or 22% of manufacturing shipments in 1995 in Alberta. Exports of food and beverages in 1995 were in excess of \$1.1 billion. Alberta food processors enjoy lower overall costs than their counterparts in other Western provinces. Alberta has the lowest trucking costs in the area and has favourable back-haul rates to US and Eastern Canadian markets. Alberta has a strong agricultural land base (including an abundant supply of water) supporting the food and beverage industries.

Most recent data on manufacturing value added shows that in 1993, BC had a higher manufacturing value added at \$1.5 billion as compared to Alberta's \$1.3 billion. However, the abolition of the Crow Rate offers significant opportunity for growth in manufacturing value added for Alberta.

Alberta's manufacturing shipments for food in 1995 were the highest in Western Canada at \$5.3 billion, BC had food shipments of \$3.7 billion in the same year. Major food companies in Alberta include Beatrice Foods, Canbra Foods, Cargill Foods, and XL Foods.

Energy Based Manufacturing Industries

Alberta's chemical and chemical products industries contributed almost \$5.0 billion in manufacturing shipments in 1995, an increase of over 44% since 1988. This sector is dominated by chemicals and petrochemical products produced in world-class plants. The chemical industry is export oriented (Alberta exported \$2.9 billion in 1995) and Alberta is one of North America's major chemical producing regions, with roughly one-quarter of Canada's chemical production capacity and more than half of its petrochemical capacity. Petrochemicals, chemical fertilizer, industrial inorganic chemicals and specialty chemicals make up the chemical products industry. Major players in this sector include Dow Chemical, Novacor Chemicals, Rhone-Poulenc, Shell Canada Chemical, Sherritt and Union Carbide.

The refined petroleum industries contributed over double that of any other Western province with \$3.8 billion in manufacturing shipments in 1995. Alberta supplies most of the western Canadian market in refined petroleum products. There are currently five refineries in Alberta operated by Esso, Petro-Canada, Shell Canada, Husky Oil and Parkland Refining. These refineries produce a full line of products, including gasoline, diesel fuels, jet fuel, asphalt, heavy fuel oils, and lubricants.

Forest Product Manufacturing Industries

Alberta's wood industries accounted for approximately \$1.6 billion in manufacturing shipments in 1995. Although BC has a considerably larger wood products industry, Alberta's wood industries have increased by approximately 100% between 1988 and 1995, double the growth rate achieved in BC). The two main categories in Alberta's wood industries are lumber production and panelboard production. The majority of the business establishments in this industry are sawmills. Due to the maturity of this industry, trends indicate that operators will focus on cost minimization by developing more efficient plants, and on developing new products and markets with specialty operations in niche markets.

The paper and allied products industries contributed \$2.3 billion in manufacturing shipments in Alberta in 1995. Although Alberta is second to BC in manufacturing shipments (\$7.2 billion), Alberta experienced a 270% increase in shipments between 1988 and 1995, as compared to BC's growth which amounted to approximately 26%.

This industry is comprised of two major groups: paper, newsprint and paperboard industry, and pulp industry.

Industrial/Non-Resource Manufacturing Industries

The fabricated metal products industries accounted for almost \$1.5 billion in manufacturing shipments in 1995 in Alberta. While Alberta's industry is similar in size to BC, Alberta grew by 53% while BC grew by 37% from 1988 to 1995. This sector consists of firms that add value at the secondary stage to metal manufacturing, and includes fabricated structural metal products, hardware and tool industries, stamped, pressed and coated metal products, and other fabricated metals. The Alberta fabricated metal products industry, in the past, depended on the oil and gas industry as its primary market. Fabricated metal industries are focusing on accessing international markets, and new product developments such as non-wood construction materials.

The electrical and electronic products industries in Alberta accounted for almost \$1.3 billion in manufacturing shipments in 1995. International exports were \$871 million in 1995; over 67% of the sector's manufacturing shipments went to the export market. Alberta led the Western Provinces in terms of sector size and also experienced 277% growth in shipments between 1988 and 1995 (largest of any of the SIC manufacturing sectors). The electrical and electronic products sector in Alberta is made up of companies that manufacture telecommunications equipment (Northern Telecom being the major player), instruments and process control products, electronic equipment and components, computing equipment (Hewlett Packard is a major player in Alberta), and household appliances. The global networks in this industry have blurred traditional product lines and geographic market segments.

The machinery industries contributed almost \$1.2 billion in manufacturing shipments in 1995 in Alberta. Alberta ranks first among the Western provinces and also experienced significant growth in shipments over the 1988 to 1995; growth for the period exceeded 56%. The machinery industries in Alberta produce machines and parts for oil and gas, agricultural, forestry, mining, construction and other industries. There are opportunities in joint ventures, with international partners, to increase markets and explore technological innovations.

The primary metal industries contributed almost \$1.1 billion in manufacturing shipments and \$269 million in manufacturing value added in Alberta in 1995. Alberta leads the Western Provinces in manufacturing shipments. Primary metal industries are cyclical, and Alberta experienced a 2% decrease in manufacturing shipments between 1988 and 1995. This industry includes the steel pipe and

tube industry (including Altasteel, ISPCO, Prudential Steel), primary nickel and cobalt production (Sheritt, one of only two cobalt producers in Canada), and other primary metal production. A major research investment in Westaim Technologies, affiliated with Sheritt, has resulted in the production of advanced industrial materials, including composite coatings for the aerospace and electronics industries, ceramics, metal surface coatings, anti-bacterial coatings for health protection. Leaders in the primary metal industries use state of the art technology to improve quality and efficiency, and meet increasingly high environmental regulations.

The printing, publishing and allied industries in Alberta had manufacturing shipments of \$896 million in 1995. BC had manufacturing shipments of \$1.1 billion. This industry includes newspaper and periodical publishing, books, and commercial printing.

The non-metallic mineral product industries in Alberta contributed \$781 million in manufacturing shipments in 1995. While Alberta was second to BC in manufacturing shipments, Alberta's manufacturing value added led the Western Provinces. This sector includes cement, ready mix and concrete products, gypsum, ceramic clay products, fibre insulation and lime production. Most firms in this industry are small with under 50 full-time employees. The industry experiences the same general cyclical swings as the construction industry.

The plastic products industries contributed \$414 million in manufacturing shipments in 1995. Although there are a large number of small scale operators producing a wide variety of products in Alberta, the plastic products industries continue to grow. Alberta experienced the highest growth among the Western provinces from 1988 to 1995 at 43%. Dow Chemical, DuPont, Union Carbide, Geon Vinyl, AT Plastics, ZCL Composites, Greenfield Plastics and SPM/A Dynacast Company are examples of major plastic manufacturers in the Province. The Alberta Industrial Polymer Centre, now in its formative stages, is an organization linking resources of universities, colleges, the Alberta Research Council and industry in Alberta.

The transportation equipment industries in Alberta contributed \$394 million in manufacturing shipments in 1995. Alberta has shown the greatest increase over the 1988 to 1995 period at 73%. Transportation equipment manufacturers in Alberta mainly produce truck boxes and vehicles for the construction, mining, oil and gas, and agriculture industries. The Alberta transportation equipment industries also include aerospace and aircraft parts such as electronics, advanced composites, graphites, defence systems and components for jet engines; CAE Aviation, Hughes Aircraft, and Pratt & Whitney are key manufacturers.

The furniture and fixtures industries had manufacturing shipments of \$327 million in Alberta in 1995. Alberta led the Western provinces in this industry and also had the highest growth between 1988 and 1995 at 51%. The industry includes household furniture and office furniture industries.

The clothing and textile industries (including clothing, textile products, and leather and allied products) contributed approximately \$235 million in manufacturing shipments in 1995. This is a small but potentially emerging industry in Alberta. Levi Strauss is an example of a major successful clothing manufacturer in the Province.

Other industrial/non-resource manufacturing industries in Alberta had almost \$286 million in manufacturing shipments in 1995. These industries include scientific and professional equipment, recording instruments, ophthalmic goods, jewellery and precious metals, sporting goods, and signs and displays. Manufacturing value added for these other industries grew about 70% between 1988 and 1995.

The "Alberta Advantage"

Manufacturing industries in Alberta are achieving a very competitive position through a favourable commercial environment and the lowest business costs. The following factors contribute to the "Alberta Advantage" in manufacturing:

- raw materials and other inputs
- transportation fuels, natural gas and electricity costs
- cost-effective transportation
- skilled, productive labour
- specialized research capability
- tax rates

The strong resource base in the Province has created a dynamic economy and the raw materials crucial to many manufacturing industries. Further, gasoline and natural gas prices are the lowest in the country, and electricity costs are amongst the lowest in Canada.

Alberta has a cost-effective transportation infrastructure that encompasses road, rail and air service connecting to other Provinces, the US, and international markets. Alberta has the lowest trucking costs in the Western US and Canada - backhaul rates are as much as one-half the normal forward haul rates. Alberta is quickly becoming the warehousing and distribution centre for Western Canada.

Alberta consistently has one of the lowest unemployment rates in Canada, and at the same time, has the highest labour force participation in Canada. The Alberta work force is highly educated, the most productive in Canada, and has the best record in relation to days lost due to work stoppage.

Alberta has an excellent advanced education system with 35 post-secondary institutions. In addition, there are over 40 specialized research centres and institutes in the Province. The Alberta Microelectronics Centre is a leader in the design and application of microelectronics technology; Telecommunications Research Laboratories is a co-operative, applied research consortium focusing on telecommunications technologies; the Electronics Test Centre offers product testing, certification, and quality assurance recognized by many national and international bodies; the Laser Institute is assisting industry to develop cost-effective production methods using laser technology; The Centre for Frontier Engineering Research performs strategic research and technology development for the energy industry; and the Alberta Research Council is a leader in developing and promoting various advanced technologies in Alberta.

Alberta has the lowest overall tax structure in Canada and is the only province without a provincial sales tax. The Province has the third highest income on average in Canada and has a lower cost of living in its major urban centres than that of most other major centres. Housing is affordable.

Overall, Alberta has a comprehensive health care system, well established educational system, and a relatively low and stable cost of living. This, in addition to the numerous recreational, outdoor and cultural activities in the Province, makes Alberta an enticing place to work and live.

Next Steps

Changing economic, political, and competitive factors are having major implications for all manufacturing industries. The changing regulatory environment is also contributing to major changes within the industry. The significance of all these changes has resulted in many manufacturing companies reassessing the key levers that influence their competitiveness, including their geographic location.

The industry's restructuring as a result of these driving forces is characterized by the following trends:

- focus on core competencies;
- improvement in productivity and efficiency;

- customization of products to suit customers' needs;
- utilization of advanced manufacturing technologies;
- development of new products;
- development of new markets;
- integration with international joint ventures;
- implementation of total quality management programs;
- development of co-operative working relationships and networks.

Alberta leads the Western provinces in a significant number of manufacturing sectors. Alberta's top opportunities are to capitalize on the comparative overall cost advantages in serving the target markets, and to focus on technology (including biotechnology, IT and advanced materials). The top challenges for the Province will be to:

- increase the value added component of resource based manufacturing,;
- continue changing the mindset from local to global competition;
- focus on product R&D not process R&D; and
- to collaborate/partner instead of competing at the local, inter-provincial and international levels.

Alberta manufacturers should further develop cluster-based initiatives designed to provide shared resources and costs in a value chain of similar or complementary operations. These clusters provide many benefits in linking educational and research institutes/expertise, well established supplier bases, operational excellence and international marketing experience. The development of strong, integrated clusters will enhance industry competitiveness on an international scale.

Alberta should work with the other Western provinces to develop strong, integrated, cluster-based industry sectors in areas such as biotechnology, IT and advanced materials/manufacturing. Each of the Western provinces have particular strengths in some aspect of each of these sectors - no province has developed all of the components necessary to be competitive internationally. However, each province has complementary strengths that when combined have the potential to create a strong, Western Canadian Advantage.

Further, as part of the Province's overall manufacturing strategy, Alberta should work with any industry participants, associations and supporting institutions to develop strategies relating to industry expansion and retention in parallel with strategies for industry attraction.

Purpose Of Study

Manufacturing is an important component in Alberta's economy. Changing economic and regulatory environments have led to serious assessment of key levers of competitiveness for many manufacturing companies. One of these levers is geographic location.

The Province is now looking at ways to attract manufacturing companies to Alberta. As part of the Province's manufacturing strategy, Alberta Economic Development and Tourism is seeking to develop a comprehensive profile of manufacturing in Alberta.

This report provides an industry profile that examines:

- trends and growth in manufacturing in Alberta and Canada;
- sector-by-sector description and highlights of manufacturing in Alberta;
- comparison of the manufacturing industry to other sectors in Alberta;
- comparison of the Alberta manufacturing industry to other Western Canada and Northwestern United States; and
- identification of potential advantages/benefits of manufacturing in Alberta.

Methodology

Our assignment entailed a compilation of existing data and information on the manufacturing industry in Canada, Alberta, other Western Provinces (British Columbia, Saskatchewan and Manitoba) and certain Northwestern United States (Washington, Montana, Oregon, Idaho, Wyoming, Utah, and Colorado). Relevant industry information, sector studies and Statistics Canada data were identified and collected.

Based on this information, we assembled the facts and figures to create a profile of manufacturing in Alberta. We compared and ranked the manufacturing industry sectors in Alberta to other Western Canadian Provinces and Northwestern United States. We also identified key comparative factors and potential advantages of manufacturing in Alberta.

Our assignment and this profile of manufacturing in Alberta is based on existing data and information gathered and compiled. Due to the limited scope of our assignment, a detailed analysis and assessment of manufacturing sectors and comparison to other jurisdictions was not conducted. In particular, preparation of comprehensive sector descriptions and analysis were beyond the scope of this report.

The sources used for compiling this information were primarily from Alberta Economic Development and Tourism and Statistics Canada. The list includes:

- Alberta International Export Strategy, Government of Alberta, 1995
- Manufacturing Industries of Canada: National and Provincial, Statistics Canada, 1993, 1994-95 updates
- Alberta's Manufacturing Industries, AEDT 1992
- Manufacturing our Future, CMA, 1995
- Manufacturing in Alberta, Making it Happen, CMA, 1994
- 1992 Census of Manufacturers, various states, US Bureau of the Census, 1995
- Alberta Advantage, various promotional material , 1992-95
- Sector descriptions and highlights, AEDT
- Various sector directories, AEDT

Based on the findings of this process, we have recommended certain further steps to be taken in developing a strategy to attract manufacturing companies to Alberta.

Introduction

Manufacturing Defined

Manufacturing is defined by the Standard Industrial Classification (SIC) System as "mechanical or chemical transformation of materials or substances into new products...assembling products [or] blending products"¹. The SIC System classifies manufacturing according to 22 different sectors or product types. This study follows the main SIC classifications for purposes of consistent analysis.

**Figure 1 Canada's SIC Classifications:
Manufacturing**

| <u>SIC CODES</u> | <u>MANUFACTURING INDUSTRY</u> |
|------------------|--|
| 101-109 | Food Products |
| 111-114 | Beverages |
| 121-122 | Tobacco Products |
| 151-159 | Rubber Products |
| 161-169 | Plastic Products |
| 171 | Leather Products |
| 181-183 | Primary Textiles |
| 191-199 | Textile Products |
| 243-249 | Clothing |
| 251- 259 | Wood Products |
| 261-269 | Furniture & Fixtures |
| 271-279 | Paper & Allied Products |
| 281-284 | Printing, Publishing & Allied Industries |
| 291-299 | Primary Metal Industries |
| 301-309 | Fabricated Metal Products |
| 311-319 | Machinery |
| 321-329 | Transportation Equipment |
| 331-339 | Electrical & Electronic Products |
| 351-359 | Non-Metallic Mineral Products |
| 361-369 | Refined Petroleum & Coal Products |
| 371-379 | Chemical & Allied Products |
| 391-399 | Other Manufactured Products |

Manufacturing has also been defined under NAFTA, by provincial tax law and finally by Revenue Canada. Considering technology, changing business organization and market demands, it appears that

¹ Canadian Manufacturers' Association, 1995

manufacturing is not limited to those industries classified under SIC codes. For example, advanced technologies are not clearly delineated in the current SIC codes.

A broader definition is used by the Canadian Manufacturers Association (CMA) which defines manufacturing as follows:

"Manufacturing consists of all those activities directly involved in changing the physical properties of tangible goods in commercial production processes;

Manufacturing enterprises comprise all establishments engaged in manufacturing; and

Canadian manufacturers comprise all enterprises located in Canada that are similarly engaged."

Given the various ways of defining and classifying manufacturing, and as a result of changes in the manufacturing environment, we propose a broad definition of manufacturing as "processes that transform and produce goods that add value in production"².

All of these definitions reinforce the need to include a broader scope of activities (i.e. from design to delivery) and a broader range of goods when considering manufacturing in Canada.

General Overview

Manufacturing In Canada

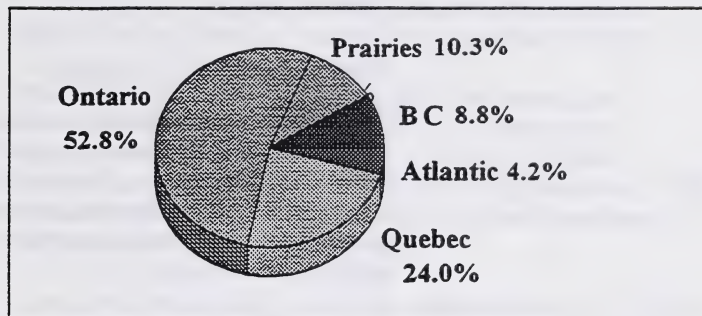
Manufacturing makes the largest economic contribution of all business sectors to Canada's economy. In 1994, manufacturing shipments were \$350 billion or 18.5% of Gross Domestic Product (GDP). By 1995, manufacturing shipments grew to \$387 billion. The industry employed roughly 2 million Canadians or 14.7% of the total workforce. Manufacturing ranked third in terms of employment behind Personal, Business and Social Services (38.9%) and Trade (19.5%).³

Figure 2 shows manufacturing shipments by region in Canada. Central Canada remains the leader in shipments, primarily due to the transportation equipment industry.

² Canadian Manufacturers' Association, 1995

³ Statistics Canada

Figure 2 Manufacturing Shipments By Region



Source: Canadian Manufacturers Association, 1995

Canadian manufacturing is a source of demand for many other business sectors. "Manufacturers utilize, in the production process, 46% of the values of agricultural output in Canada; 75% of the output of our forest industry; 72% of our fisheries, and 55% of our mining and petroleum production; 15% of construction activity, 12% of wholesale and retail trade, 12% of financial services, and 16% of other business services in Canada"⁴. This indicates that manufacturing is the driving force in generating economic activity for the Canadian economy as a whole.

Besides direct contributions to GDP, manufacturing also contributes indirectly to the economy. Manufacturing adds to personal income through high-paying jobs. Average weekly earnings for all employees in manufacturing are 22% higher than average earnings across other sectors. Manufacturing also contributes to capital investment activity, accounting for over 16% of total fixed asset investment activity in 1994. This ranks manufacturing second only to communications & utilities in terms of capital investment by sector. Manufacturing is the leader in terms of industrial research and development activities by sector in Canada. Of \$5.8 billion spent on R&D in 1994, more than 65% was conducted by manufacturers.

Manufacturing provided approximately 14% of the jobs in Canada. The changing environment of manufacturing has accounted for a declining share of the total work force employed in this industry. At the same time, advanced labour-saving technologies and higher labour productivity have made Canadian manufacturers more productive and competitive, and created jobs in other sectors.

Manufactured and processed goods represent approximately 68% of Canada's total exports (total exports are 35% of Canada's economic output). The volume of manufactured exports increased by over 15%

⁴ Canadian Manufacturers' Association, 1995

in 1994 and contributed significantly to a 4.2% increase in Gross Domestic Product.

Manufacturing In Alberta

Total manufacturing shipments in Alberta for 1995 were almost \$27 billion which is an increase of almost \$2 billion over 1994. "In terms of real value of shipments, Alberta's manufacturing base has tripled since 1970."⁵ It is no surprise that the fundamental driver of Alberta manufacturing is the natural resources of the province - oil and gas, agriculture and forestry.

Alberta's GDP is made up of goods producing and service producing industries. In 1994, goods producing industries are estimated at about 41% of Alberta's GDP of \$76.3 billion. Service producing industries accounted for almost 59% of the Province's GDP. Figure 3 shows the breakdown by sector of Alberta's economy in 1994.

Figure 3 Structure Of Alberta's Economy, 1994

| <u>Industry</u> | <u>Industry % Share of Alberta GDP</u> |
|--------------------------|--|
| Manufacturing | 10.1 |
| Agriculture/Fishing | 2.6 |
| Primary | 17.8 (of which oil & gas is 13.5) |
| Construction | 6.6 |
| Utilities | 4.0 |
| Total Goods Producing | 41.1 |
| Transportation & | |
| Communications | 8.0 |
| Wholesale & Retail | 10.9 |
| Trade | |
| Financial Services | 13.9 |
| Other Services | 21.0 |
| Public Administration | 5.1 |
| Total Services Producing | 58.9 |
| All Industries | 100.0 |

Source: Alberta Treasury, August, 1995

Alberta's top manufacturing industries according to 1995 shipments were food industries, chemical and chemical products industries, refined petroleum and coal products industries, paper and allied products, wood products industries, fabricated metal products, and electrical and electronic products industries.

Alberta's manufacturing industry directly employed 109,500 individuals out of 1.4 million employed in 1995. Manufacturing is ranked fourth in employment by industry in Alberta based on 1995 labour force statistics. Average weekly wages for manufacturing sector employees are the third highest in Canada, next to BC and

⁵ Alberta Economy at a Glance, 1995

Ontario, at \$625/week. Alberta's manufacturing employees also have a 21% higher per capita productivity level than other provinces (\$29,000 in real output per manufacturing employee in 1993).⁶

Manufacturing contributes to and benefits from research and development in Alberta. Roughly \$300 million was spent on industrial research and development in Alberta in 1993, with manufacturers conducting approximately 48% of private sector R&D, or about \$120 million. 1994 preliminary data shows investment of \$1.3 billion or 6.9% of total investment.

The manufacturing industry in Alberta comprised about 7.1% of total fixed investment activity in 1995 at just over \$1.3 billion. Fixed investment activity leads not only to expansion of production facilities but also to spin-offs in supply related industries and product technologies.

Preliminary data shows that manufacturing exports (\$10.5 billion) constituted 39.5% of Alberta's total international exports of goods and services in 1995.⁷ Out of all manufacturing industries in Alberta, the top five performers in exports were:

| | |
|-----------------------------------|----------------|
| Chemicals/Chemical Products - | \$ 2.9 billion |
| Refined Petroleum/Coal Products - | \$ 2.1 billion |
| Paper & Allied Products - | \$ 1.4 billion |
| Food Processing - | \$ 1.1 billion |
| Electrical/Electronic Products - | \$ 0.9 billion |

Data shows that total commodity exports grew by 11.6% from 1994 to 1995. Manufacturing exports grew by 19.8% during this same period.

Factors Affecting Manufacturing

The Canadian Manufacturing Association refers to six levers of change that affect manufacturing in Canada. These levers have forced re-structuring and innovation to become a top priority for manufacturers.

More Open Markets

Market liberalization through removal of tariffs or restrictions under the terms of the General Agreement on Tariffs and Trade (GATT), the World Trade Organisation (WTO), the Canada-US Free Trade Agreement (FTA) and the North American Free Trade Agreement

⁶ Alberta Economy at a Glance, 1995.

⁷ AED&T, Alberta's International Exports, Jan.-Dec., 1995, March, 1996.

(NAFTA) has opened new international market opportunities for Canadian manufacturers. There are sources for materials, components, services, technologies, labour and financing available as never before. Manufacturers are becoming internationally focused, and are integrating operations across North America and offshore.

Market liberalization has introduced the challenge of competition to these same markets. A survey conducted by the Canadian Manufacturers' Association in 1995 shows that over a third of its members are selling more product into the United States and many are purchasing from the US and other countries. Most manufacturers responded positively to the impact of NAFTA and see it as more of an opportunity than a threat to Canada's manufacturing industry.

The impact of market liberalization on Canadian manufacturers has been one of increased awareness. Manufacturers are building a world-wide strategic focus into their operations.

Intense Competition

Competitive pressures from market liberalization have been compounded by the emerging economies of Latin America and the Pacific Rim which introduce new sources for lower cost, and technology-intensive manufacturing and processing to the international markets. In addition, the disintegration of the Soviet Bloc has introduced a new source of primary metals and other raw materials to international markets.

Competition affects pricing. With the expansion of world-wide capacity and continuous productivity improvements and innovations, price increases have become virtually impossible to implement regardless of the "value added" by a product.

The pressures of intensified competition have given rise to a new means of long-term survival for manufacturers in Canada: development of new product lines or innovation of existing ones to expand the customer base and sales volume.

Advances In Technology

The goods that are being manufactured today are radically different from those produced even ten years ago. The Canadian Manufacturers' Association describes fields of advanced research affecting manufacturing today. These include:

- micro-electronics;
- micro-engineering;
- superconductivity;
- advanced materials;
- sensors and artificial intelligence;
- lasers and sub-atomic sciences; and
- biotechnology.

Figure 4 shows four areas of critical technology that the US Council on Competitiveness has identified as having a significant impact on the US and Canada in the coming decades.

Figure 4 Critical Technologies

Materials & Processing Technologies

Bioactive Materials, Bioprocessing, Drug Discovery Techniques, Emissions Reduction, Genetic Engineering, Recycling/Waste Processing, Catalysts, Chemical Synthesis, Magnetic Materials, Metal Matrix Composites, Net Shape Forming, Optical Materials, Photoresists, Polymers, Polymer Matrix Composites, Superconductors, Advanced Metals, Membranes, Precision Coating, Display Materials, Electronic Ceramics, Electronic Packaging Materials, Gallium Arsenide, Silicon, Structural Ceramics

Powertrain & Propulsion Technologies

Airbreathing Propulsion, Low Emission Engines, Rocket Propulsion, Alternative Fuel Engines, Electrical Storage Technologies, High Fuel Engines, Electrical Storage Technologies, High Fuel Economy/Power Density, Electric Motors & Drives

Engineering/Production Technologies

Computer-Aided Engineering, Systems Engineering, Advanced Welding, Computer Integrated Manufacturing, Human Factors Engineering, Joining & Fastening Technologies, Measurement Techniques, Structural Dynamics, Design for Manufacturing, Flexible Manufacturing, High-Speed Machining, Integration of R&D & Manufacturing, Advanced Scientific Instruments, Precision Bearings, Precision Machining & Forming, Integrated Circuit Fabrication & Test Equipment, Robotics & Automated Equipment

Electronic Components

Magnetic Information Storage, Microprocessors, Logic Chips, Sensors, Submicron Technology, Actuators, Electro-photography, Electrostatics, Laser Devices, Photonics, Electroluminescent Displays, Liquid Crystal Displays, Memory Chips, Multichip Packaging Systems, Optical Information Storage, Plasma & Vacuum Fluorescent Displays, Printed Circuit Board Technology

Information Technologies

Animation & Full Motion Video, Artificial Intelligence, Data Representation, Expert Systems, Handwriting & Speech Recognition, Natural Language, Operating Systems, Broad Band Switching, Digital Signal Processing, Processor Architecture, Semantic Modelling & Interpretation, Software Engineering, Transmitters & Receivers, Applications Software, Computer Modelling & Simulation, Data Retrieval & Update, Graphics Hardware & Software, High-level Software Languages, Neural Networks, Optical Character Recognition, Digital Infrastructure, Fibre Optic Systems, Hardware Integration, Multiplexing, Spectrum Technologies

Advanced manufacturing and processing technologies are now in use and have changed the face of what is produced today, but more importantly they are necessary for designing new generations of products.

Communications and information technologies are another dynamic force on today's manufacturers. They permit faster communication, collection of information, and design and engineering. As in other business sectors, information technology is shrinking the world and creating "real-time" communications. Possessing leading edge information technology will be a significant force on restructuring manufacturing operations into the next century.

More Demanding Customers

Customers are looking for the newest and highest quality product available in the shortest time and at the best price. This is true regardless of whether the customer is an individual or a business. Quality is a given and value for money is a standard expectation.

These expectations translate to improved responsiveness to customers by manufacturers in terms of greater flexibility, shorter lead times and ability to customize to customers' requirements.

Heightened Social Expectations

Health, safety and environmental protection are increasingly important factors for manufacturers to adhere to. Failure to meet expectations not only means losing customers, but also could lead to legal liability, lawsuits and loss of external financing.

These increasing social expectations are becoming an integral part of corporate culture. Manufacturers must be proactive in their involvement in dealing with these issues, otherwise they may soon be forced to comply with stricter government legislation.

Cost Pressures

As for most business sectors, the greatest force for change is the cost of doing business. With competition forcing prices down and capital costs increasing, no business can survive for long if it allows unit production costs to exceed prices. This leads companies to alleviate cost pressures by lowering production costs through reduction of labour costs, increased productivity or contracting out. Another answer to cost pressures is to develop new or improved products that may lead to expanded markets.

Trends

The six driving forces discussed above are influencing the way that manufacturers do business in Canada and abroad. The industry's restructuring as a result of these driving forces is characterized by the following trends.

Focus On Core Competency

Manufacturers are focusing their efforts and resources on what they do best. This translates into narrowing the range of goods and services produced, but maintaining the flexibility within that range to meet customers' requirements. It also leads to contracting out parts of the production process and to the formation of alliances/partnerships with suppliers.

Productivity And Efficiency Improvement

Manufacturers are forced by increased competition and rising costs to eliminate, reduce or push down the cost of activities that do not directly add value to their products and services. They achieve this by rationalizing or contracting out portions of work to make the organization flatter.

Another element of cost reduction is to make improvements in efficiency and eliminate waste. By integrating customers and suppliers in a value chain, manufacturers can compress cycle times and lead times to get products to market faster.

Customization

Increasing customer demands have driven manufacturers to design and produce goods to the exact specifications of the customer.

Companies are investing in flexible production systems that can be easily modified. Technology allows companies to develop closer relationships with their customers regarding many issues including product design.

Advanced Manufacturing Technologies

According to the CMA, computer assisted machines accounted for over 40% of all spending on manufacturing and process equipment in 1994. This is up from 34% in 1991 and 14% in 1985. Over 90% of manufacturing establishments in Canada have at least one advanced production system in place. Advanced technologies allow for higher productivity and reduce labour costs on the production floor. These technologies can also help to achieve integrated design, engineering and production processes.

With more computer assisted machines doing more work, it follows that workers must be highly skilled and proficient not only in computers but also with managing several tasks running simultaneously.

New Products

Canadian manufacturers spent almost \$4 billion on research and development in 1994. In addition, with the increasing presence of computer assisted machines on shop floors, more new products are conceived, engineered and developed at that level. Canadian companies are spending more money acquiring copyrights and patents than any other country.

It is clear that new product development is a key strategic factor in expanding markets and increasing sales.

New Markets

Canada exports over 50% of its manufacturing production. Alberta exported approximately 39% of its manufacturing shipments with 77% of these destined for the US. Approximately 82% of all Canadian exports are to the US, but exports to other countries such as Japan, Europe and other OECD countries are also rising rapidly. Over 60% of these exports are inter-corporate and exports are no longer seen in terms of marginal production for secondary markets. There is increased integration between suppliers and customers as part of a more fully integrated international market.

International Integration

Canadian manufacturers' domestic share has decreased over the past ten years. A greater share of demand for manufactured goods is being

met by imports. There is an increasing integration between Canadian manufacturers and companies beyond Canada's borders. It is becoming a competitive strength to participate in international joint ventures and global networks.

Total Quality Management

Many manufacturers are implementing ISO 9000 quality standards to retain access to customers and to gain international recognition. The number of ISO 9000 certified manufacturers in Canada has risen from 450 in 1993 to 1,650 by 1995. Beyond ISO 9000, companies are working with customers to ensure that their products meet the standards set by customers.

The benefits of Total Quality Management are not only visible in product quality, waste elimination and improved efficiencies and effectiveness. Workers are empowered and companies are taking proactive steps to be leaders in improving energy and resource use.

Networks

Manufacturing is becoming diffused in terms of organizational structure as a result of participation in international business networks. Activities are reintegrated to reflect inter-corporate value adding teams. This is the first step toward the "virtual enterprise" of the future.

Many processes are becoming modularized to more easily adapt to different projects and products, and to meet different specifications.

Canadian companies are realizing that the only way to compete in today's complex manufacturing environment is to develop co-operative working relationships and exchange mutually profitable information among companies, regardless of national borders.

Alberta

In order to compare the "attractiveness" of Alberta relative to other provinces and states, a number of general indicators, and several factors significant to manufacturing, have been considered.

GDP

Alberta's GDP in 1994 was \$76.3 billion. Over the past five years, Alberta has experienced the fastest growth of Canada's economies. The strong resource-base in the Province has created a dynamic economy with many varied industries. Energy remains the largest factor in contributing to Alberta's GDP.

Taxation

Alberta has the lowest overall taxes in Canada. Alberta is also the only province in Canada that has no provincial sales tax. Gasoline taxes are the lowest in Canada. The Province has one of the lowest overall corporate income tax rates. In 1995 corporate tax rates were:

- general - 15.5%;
- manufacturing & processing - 14.5%; and
- small business - 6%.

Alberta has no general capital or payroll taxes and has the lowest personal tax rates in Canada.

Employment

In 1995, there were 1.4 million people employed in Alberta. Alberta has consistently shown one of the lowest unemployment rates in Canada over the past ten years. At the same time, Alberta has the highest labour force participation in Canada with over 70% of people of working age in the labour force. The workforce in Alberta is highly educated with over 40% of workers possessing a post-secondary certificate, diploma or university degree.

Income

Alberta has the third highest income on average in Canada. At \$22,000 on average, Alberta ranks behind only Ontario and BC.

Cost Of Living

Alberta has a lower cost of living in its major urban centres than that of other major centres. Home ownership costs as a percentage of household income was approximately 34%. Gasoline and natural gas prices are the lowest in the country. Electricity costs in Alberta are among the lowest in Canada.

Labour

As mentioned previously, the Alberta workforce is a highly educated one. Alberta workers also have 21% higher per capita productivity than the national average. Alberta has consistently recorded one of the best labour records in terms of days lost due to strikes, 0.9 as compared to the national average of 5.5 person days lost due to work stoppage per 10,000 work days.

Transportation

Alberta has a cost effective transportation infrastructure that encompasses road, rail and air service connecting to other provinces, US and international markets. Alberta has the lowest outboard trucking costs in Canada and Northwest US. Alberta is quickly becoming the Western distribution hub for retail, wholesale and manufacturing sectors.

Education

Alberta has an advanced education system with 35 post-secondary institutions including 4 universities, 3 technical institutes and a number of community colleges. The University of Alberta, Canada's largest English-speaking university, and the University of Calgary are major research centres in Western Canada.

Research And Development

There are over 40 specialized research centres and institutes in Alberta. These operations are working to promote technological development in telecommunications, advanced materials, medicine and health care.

The Alberta Microelectronics Centre is a leader in the design and application of microelectronics technology; Telecommunications Research Laboratories is a co-operative, applied research consortium focusing on telecommunications technologies; the Electronics Test Centre offers product testing, certification, and quality assurance recognized by many national and international bodies; the Laser Institute is assisting industry to develop cost-effective production methods using laser technology; The Centre for Frontier Engineering

Research performs strategic research and technology development for the energy industry; the Alberta Research Council is a leader in developing and promoting various advanced technologies in Alberta.

Quality Of Life

Alberta has a comprehensive health care system, a well-established educational system and a relatively low cost of living. There are numerous provincial and national parks for outdoor recreation. There is a broad range of festivals and activities held across the Province, with many cultural and arts-related events to choose from. Overall, Alberta is an enticing place to work and live.

Other Provinces In Western Canada

British Columbia

British Columbia's economy has grown at an average rate of 3.5% between 1984 and 1994. Unemployment in BC has been relatively high at roughly 9% in recent years. Corporate income taxes in BC are among the highest in Canada in 1995:

- General - 16.5%;
- Manufacturing and Processing - 16.5%; and
- Small Business - 10%.

The cost of living in urban centres in BC is the highest of any other Western province. Home ownership costs as a percentage of household income was almost 60% in BC, almost 20% higher than the national average. BC's labour record is the poorest of the four Western provinces, with approximately 10 days lost due to work stoppage per 10,000 work days between 1990 and 1994. Alternatively, BC has an abundance of natural resources and a favourable climate, as well as access to markets through its international ports.

Saskatchewan

Saskatchewan's economy has grown at an average rate of 1.8% between 1984 and 1994. The province's strong agricultural sector has contributed to the cyclical nature of Saskatchewan's growth. Unemployment in Saskatchewan was the lowest on average between 1990 and 1994 at around 7%. Corporate income taxes in Saskatchewan are also higher than most of Alberta's tax rates:

- General - 17%;
- Manufacturing & Processing - 10%; and
- Small Business - 7.5%

Housing is affordable in Saskatchewan relative to BC and Manitoba. Home ownership costs as a percentage of household income was approximately 35% in 1994. Saskatchewan's labour record is second to BC in terms of poor performance in Western Canada. Roughly 9 days on average were lost due to work stoppage per 10,000 work days between 1990 and 1994.

Manitoba

Manitoba's economy has grown at an average rate of 1.2% between 1984 and 1994. Unemployment in Manitoba has compared favourably with Alberta at roughly 9% on average between 1990 and 1994. Corporate tax rates in Manitoba are as follows:

- General - 17%;
- Manufacturing & Processing - 17%; and
- Small business - 9%.

The cost of living in Manitoba compares favourably to Alberta. Home ownership costs as a percentage of household income was roughly 37% in 1994. Manitoba's labour record ranked second to Alberta in the Western provinces between 1990 and 1994. On average, roughly 6 days were lost due to work stoppage per 10,000 work days during this period.

Manufacturing Performance

We developed groupings of complementary industries in the 22 SIC codes to simplify the presentation of our analysis. Please note that the food and beverage sectors are grouped together in our description. Also, clothing and textiles is now an overall term for leather and allied products industries, primary textiles industries, textile products industries and clothing industries. The rest of the categories are shown individually as per the SIC categories.

Based on 1995 Statistics Canada data, Alberta manufacturing shipments are \$26.9 billion and manufacturing value added is estimated at \$8.5 billion based on a linear trend of 1983 to 1995 data. This puts Alberta in a strong second position in the Western provinces.

Table 1, following page 29, summarizes the manufacturing shipments by sector for Alberta, BC, Manitoba and Saskatchewan. This table also shows the percentage growth in shipments between 1988 and 1995 per sector.

While resource-based manufacturing industries contributed greatly to the thriving manufacturing industry in Alberta, it is important to note the significant contribution of industrial/non-resource manufacturing industries.

- **Industrial/Non-Resource Manufacturing Industries**

The sectors that comprise this grouping are fabricated metal products industries, electrical and electronic products industries, machinery industries, primary metal industries, printing, publishing and allied industries, non-metallic metal industries, plastic products industries, transportation equipment industries, furniture and fixtures industries, clothing and textile industries, and other manufacturing industries.

These remaining sectors, not directly related to the resource industries or agriculture, are a significant portion of all Western provinces manufacturing industries. These sectors represent approximately 31% of Alberta's manufacturing shipments.

Manufacturing shipments for Alberta for all other sectors not related to resource industries is \$8.3 billion. BC leads the Western provinces at \$9.1 billion and Manitoba is third at \$4.7 billion.

- **Agricultural Processing Industries**

Alberta's food and beverage manufacturing shipments of \$5.9 billion in these sectors leads the Western provinces, while BC is second at \$4.3 billion. Alberta's estimated manufacturing value added is \$1.4 billion in these sectors.

These sectors represent approximately 22% of Alberta's manufacturing shipments and 12% of estimated manufacturing value added.

- **Energy Based Manufacturing Industries**

Alberta dominates in the refined petroleum, coal, chemical and chemical products sectors with manufacturing shipments of \$8.7 billion. BC is second in manufacturing shipments at \$1.2 billion. Alberta's manufacturing value added is estimated at approximately \$4.7 billion.

These sectors represent approximately 32% of Alberta's manufacturing shipments.

- **Forest Product Manufacturing Industries**

BC dominates in the wood, paper and allied products sectors with \$17.6 billion of manufacturing shipments (53% of their total). Alberta's manufacturing shipments of \$3.9 billion is second in the Western provinces. Alberta's manufacturing value added is estimated to be \$1.1 billion.

In these sectors, Alberta's growth in manufacturing shipments between 1988 and 1995 was 175% as compared to BC at only 39%.

These sectors represent approximately 15% of Alberta's manufacturing shipments.

Top Sector Performance And Highlights

Each of the 22 major SIC sectors has been analyzed for the period from 1988 to 1995 using manufacturing shipments, manufacturing value added, employment and number of establishments.

Overall, Alberta and BC are relatively close in terms of number of industries in which they lead in either manufacturing shipments or

Table 1

Comparison of Shipments by Province, 1988 - 1995

Provincial Comparison of Shipments and Percentage Growth, 1988-1995

| SIC | Description | Man | | | Sask | | | BC | | | AB | | |
|-----|---|--------|--------|----------|--------|--------|----------|---------|---------|----------|---------|---------|----------|
| | | 88 | 95 | % Change | 88 | 95 | % Change | 88 | 95 | % Change | 88 | 95 | % Change |
| | Agricultural | | | | | | | | | | | | |
| 10 | Food Industries | 1640.3 | 1576.1 | -3.9% | 985.8 | 1034.6 | 4.9% | 2928.6 | 3666.5 | 25.9% | 4091.4 | 5292.5 | 29.4% |
| 11 | Beverage Industries | 174.4 | 239.3 | 37.2% | 117.9 | 72.6 | -38.5% | 471.5 | 677.3 | 43.6% | 417.5 | 607.7 | 45.8% |
| 12 | Tobacco Products Industries | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | | X |
| | Sub-Total | 1814.7 | 1815.4 | 0.0% | 1103.7 | 1107.1 | 0.3% | 3400.1 | 4363.8 | 28.3% | 4508.9 | 5900.1 | 30.9% |
| | Industrial/Non-Resource | | | | | | | | | | | | |
| 15 | Rubber Products Industries | X | X | | X | X | | X | X | | X | X | X |
| 16 | Plastic Products Industries | 184.9 | 239.2 | 29.4% | 47.4 | 47.7 | 0.6% | 371.4 | 490.3 | 32.0% | 289.6 | 414.3 | 43.0% |
| 17 | Leather & Allied Industries | 40.9 | X | | 6.0 | 3.9 | -35.0% | X | 13.3 | | 23.3 | 35.5 | 52.2% |
| 18 | Primary Textile Industries | X | X | | 0.0 | | | 20.3 | | | X | X | X |
| 19 | Textile Products Industries | 53.0 | 52.8 | -0.5% | 12.5 | 16.9 | 34.1% | 82.5 | 114.1 | 38.4% | 65.6 | 47.1 | -28.3% |
| 24 | Clothing Industries | 338.2 | 324.2 | -4.1% | 15.0 | 30.5 | 103.1% | 221.6 | 209.5 | -5.5% | 140.0 | 152.2 | 8.1% |
| 25 | Furniture & Fixture Industries | 153.8 | 202.5 | 31.6% | 10.6 | 9.4 | -11.2% | 187.8 | 239.0 | 27.2% | 212.9 | 306.9 | 50.6% |
| 26 | Furniture & Fixture Industries | 452.2 | 638.6 | 41.2% | 203.4 | 241.6 | 18.8% | 878.4 | 1080.5 | 22.9% | 733.9 | 896.9 | 22.2% |
| 28 | Printing, Publishing & Allied Products Industries | 153.0 | | | X | X | | 1241.9 | 1011.2 | -18.6% | 1089.7 | 1068.4 | -2.1% |
| 29 | Primary Metal Industries | 512.4 | 580.5 | 13.3% | X | X | | 1556.8 | 1583.3 | 36.9% | 954.5 | 1460.6 | 53.0% |
| 30 | Fabricated Metal Product Industries | 429.0 | 417.5 | -2.7% | 145.9 | 159.3 | 9.2% | 1563.0 | 1503.0 | -3.8% | 1606.6 | 1660.6 | 56.2% |
| 31 | Machinery Industries | 430.7 | 907.7 | 110.7% | 175.7 | 474.3 | 141.5% | 692.3 | 1053.3 | 51.1% | 781.4 | 1189.0 | 50.2% |
| 32 | Transportation Equipment Industries | 852.7 | 959.0 | 48.9% | 98.8 | 111.6 | 12.9% | 972.1 | 1249.9 | 28.6% | 227.5 | 394.2 | 73.3% |
| 33 | Electrical & Electronic Products Industries | 514.7 | 265.3 | -48.5% | 184.6 | 250.2 | 35.5% | 407.3 | 884.1 | 117.1% | 344.3 | 1298.0 | 277.0% |
| 35 | Non-Metallic Mineral Products Industries | 199.4 | 135.9 | -31.9% | 99.5 | 69.4 | -30.3% | 608.5 | 893.2 | 46.8% | 628.7 | 781.3 | 24.7% |
| 39 | Other Manufacturing Industries | 76.9 | 132.7 | 72.5% | 28.3 | 35.3 | 24.7% | 259.1 | 328.4 | 26.7% | 229.9 | 295.8 | 24.2% |
| | Sub-Total | 4028.8 | 4855.8 | 20.2% | 1027.7 | 1399.8 | 36.2% | 7101.0 | 9149.7 | 28.9% | 5703.8 | 8348.6 | 46.4% |
| | Forest Product | | | | | | | | | | | | |
| 25 | Wood Industries | 220.5 | 311.2 | 41.1% | 151.9 | 225.6 | 48.6% | 6931.9 | 10373.8 | 49.7% | 787.7 | 1595.5 | 100.0% |
| 27 | Paper & Allied Products Industries | 322.9 | 419.6 | 30.0% | X | X | | 5728.1 | 7202.8 | 25.7% | 631.0 | 2339.9 | 270.8% |
| | Sub-Total | 543.4 | 730.8 | 34.5% | 151.9 | 225.6 | 48.6% | 12660.0 | 17576.5 | 38.8% | 1428.7 | 3935.4 | 175.5% |
| | Energy | | | | | | | | | | | | |
| 36 | Refined Petroleum & Coal Products | X | X | | X | X | | 1473.5 | 1236.7 | -16.1% | 2876.4 | 3177.0 | 31.3% |
| 37 | Chemical & Chemical Products Industries | 229.1 | 380.3 | 66.0% | 164.0 | 531.2 | 223.9% | 814.6 | 1042.5 | 28.0% | 3442.6 | 4872.7 | 44.4% |
| | Sub-Total | 229.1 | 380.3 | 66.0% | 164.0 | 531.2 | 223.9% | 2288.1 | 2273.2 | -0.4% | 6319.0 | 8749.7 | 38.5% |
| | Total | 6828.0 | 7782.3 | 17.5% | 2447.3 | 3283.8 | 33.4% | 25449.2 | 33359.3 | 31.1% | 17980.4 | 26833.8 | 50.0% |

Table 2 Manufacturing Value Added (Millions of Dollars), by major industry group, 1993

| SIC | Major Industry Group | Alberta | B.C. | Sask. | Man. |
|-----|---|---------|---------|-------|-------|
| 10 | Food Industries | 1003.0 | 1,159.1 | 246.5 | 450 |
| 11 | Beverage Industries | 275.3 | 307.1 | 49.7 | 115.3 |
| 12 | Tobacco Products | --- | --- | --- | --- |
| 15 | Rubber Products Industries | X | X | X | X |
| 16 | Plastic Products Industries | 116.8 | 209.2 | 11.4 | 83.7 |
| 17 | Leather and Allied Products Industries | 11.3 | 4.8 | 1.5 | X |
| 18 | Primary Textile Industries | X | X | --- | X |
| 19 | Textile Products Industries | 21.6 | 54.9 | 6 | 21.4 |
| 24 | Clothing Industries | 78.6 | 123.4 | 11.2 | 149.5 |
| 25 | Wood Industries | 730.1 | 3,990.9 | 97.5 | 116.9 |
| 26 | Furniture and Fixture Industries | 134.4 | 107.1 | 4.1 | 98 |
| 27 | Paper and Allied Products Industries | 399.9 | 1,237.4 | X | 114.3 |
| 28 | Printing, Publishing and Allied Industries | 526.8 | 707 | 158.5 | 318 |
| 29 | Primary Metal Industries | 261.7 | 385.4 | X | 133.1 |
| 30 | Fabricated Metal Products Industries | 540 | 640.9 | 73.3 | 162.2 |
| 31 | Machinery Industries | 482 | 393.1 | 171.7 | 230.6 |
| 32 | Transportation Equipment Industries | 168.9 | 315.4 | 33.2 | 427.2 |
| 33 | Electrical and Electronic Products Industries | 313.9 | 315.8 | 101.1 | 191.9 |
| 35 | Non-Metallic Mineral Products Industries | 424.8 | 402 | 21.1 | 58.9 |
| 36 | Refined Petroleum and Coal Products | 247 | 431.4 | X | X |
| 37 | Chemical and Chemical Products Industries | 1,481.2 | 429.1 | 127.3 | 188.6 |
| 39 | Other Manufacturing Industries | 157.8 | 170.8 | 20.1 | 62.6 |

*Highlighted cells indicate top ranked province per manufacturing sector
Manufacturing value added based on 1993 statistics
Source: Statistics Canada*

value added. Table 1 summarizes the most recent performance of Alberta's manufacturing sectors as compared to the other Western provinces.

Table 1, on the previous page, shows that Alberta led the Western provinces in manufacturing shipments in 8 out of 22 sectors in 1995. The sectors in which Alberta ranked first in shipments include:

- Food Industries
- Leather and Allied Products Industries
- Furniture and Fixture Industries
- Primary Metal Industries
- Machinery Industries
- Electrical and Electronic Industries
- Refined Petroleum and Coal Products Industries
- Chemical and Chemical Products Industries

BC led in 10 out of 22 sectors including:

- Beverage Industries
- Plastic Products Industries
- Textile Products Industries
- Wood Industries
- Paper and Allied Products Industries
- Printing, Publishing and Allied Industries
- Transportation Equipment Industries
- Fabricated Metal Products Industries
- Non-Metallic Mineral Products Industries
- Other Manufacturing Industries

Manitoba led in 1 of the 22 sectors:

- Clothing Industries

The remaining 3 sectors did not have complete data disclosed.

Table 2, immediately following Table 1, shows that BC led the Western provinces in manufacturing value added in 1993 in 12 out of 22 sectors. Alberta led in 5 of the 22 while Manitoba led in 2 sectors. There were 3 sectors lacking complete data disclosure. (1995 data on manufacturing value added is unavailable. Alberta manufacturing value added for 1995 was estimated based on linear trends for consideration but not included in this section.)

Alberta has a strong position in several industries in manufacturing shipments, but lags in manufacturing value added where BC seems to pick up the slack. In 1993, Alberta's manufacturing shipments at \$21.0 billion are 77% of BC's \$27.1 billion, while Alberta's manufacturing value added of \$7.5 billion is 66% of BC's \$11.4 billion. This may be an issue to address in further research and manufacturing strategy.

The top performers in terms of overall contribution to manufacturing shipments have been identified, as well as emerging industries that are poised as "up and coming" based on the percentage change in manufacturing shipments over the years 1988 to 1995. We also identified the top "up and comers" based on the sectors in which Alberta led the Western provinces in manufacturing shipments, and also experienced high percentage growth between 1988 and 1995.

The Top Performers in Alberta in terms of manufacturing shipments for 1995 were:

1. Food Industries
2. Chemical & Chemical Products
3. Refined Petroleum & Coal Products
4. Paper & Allied Products
5. Wood Products
6. Fabricated Metal Products Industries
7. Electrical and Electronic Products
8. Machinery Industries

9. Primary Metal Industries

The Top Up and Comers in Alberta for 1995 based on percentage change in manufacturing shipments were:

1. Electrical and Electronic Products Industries
2. Paper & Allied Products
3. Wood Industries
4. Transportation Equipment Industries
5. Machinery Industries
6. Fabricated Metal Products
7. Furniture & Fixtures Industries

The Top Up and Comers for 1995 in Alberta based on leading the Western provinces in manufacturing shipments, and also high percentage growth in manufacturing shipments, were:

1. Electrical and Electronic Products Industries
2. Machinery Industries

The above industry sectors have been highlighted in the following sector overviews because of their contribution to total manufacturing shipments in Alberta in recent years.

A more detailed analysis of these sectors is presented in Alberta's manufacturing sector analysis in Appendix 1. This data can be used for further analysis on a sector-by-sector basis. This appendix includes the following manufacturing information for Alberta:

- Sub-sector total shipments, estimated value added, employment and/or number of firms, 1995
- Sub-sector percentage change in shipments and value added 1988-1995

Comparative data for the Western provinces and Northwestern United States is presented in Appendix 2. This appendix includes the number of establishments, number of employees, manufacturing value added and manufacturing shipments by sector for each of the Western provinces and Northwestern United States.

It is important to note that *the analysis was undertaken with the most recent complete set of industry statistics available*. For

Canada and Alberta, this was 1995 statistics from Statistics Canada. For the Northwest US, this was 1992 statistics from the US Department of Commerce Bureau of the Census. Any comparisons between the Canadian and US amounts are provided as broad benchmarks and cannot be taken out of this context. Exchange rates for the period are not factored into the analysis and US shipments and value added are expressed in US dollars. We have focused instead on determining the ratio of manufacturing shipments to manufacturing value added as a means of making a cursory comparison. More research is required to provide an in-depth comparison of Canadian and US manufacturing sectors.

Food And Beverage Industries

In 1995, food and beverage together accounted for \$5.9 billion or 22% manufacturing shipments in Alberta.

Alberta food processors enjoy lower overall costs than their counterparts in other western provinces and states. Alberta has the lowest trucking costs in the area and has favourable back-haul rates to US and Eastern Canadian markets. The industry has experienced rapid growth in recent years with an increasing number of companies and a diverse range of products. The disappearance of the Crow Rate has had a favourable influence on food processing with agricultural goods more economically available and could lead to more opportunities to process grain in Alberta instead of shipping elsewhere.

Alberta also has a strong agricultural land base supporting the food and beverage industry. There is an ample supply of raw materials, including water, in the Province to support continued growth in food processing. The Province is also strategically located and many major food retailers and distributors have centralized Western Canadian operations in the Province.

The United States is Alberta's largest export market purchasing almost 40% of food exports from the Province. The Pacific Rim is becoming a significant foreign market as well. Alberta's strength in food processing has led to major investments in Alberta by 11 of the top 50 US food and beverage companies.

FOOD PROCESSING INDUSTRY

The food processing industry makes up the largest portion of Alberta's manufacturing accounting for \$5.3 billion worth of shipments or approximately \$1.1 billion in value added in 1995.

Alberta leads Canada's Western provinces in processed food manufacturing shipments and has experienced higher growth

between 1988 and 1995 in this category. Alberta food processors employed over 15,000 people which represented 16.7% of all manufacturing employment in Alberta in 1993. Only British Columbia employed more manufacturing employees in food processing with over 17,500 people employed in 304 establishments in 1993. By 1995, there were 427 firms participating in the food processing industry.

Alberta and BC were similar in terms of food processing value added. Manufacturing value added in 1993 for Alberta was \$1 billion, and for BC \$1.2 billion, despite Alberta's total manufacturing shipments of food and beverage products exceeding BC's by approximately \$1.4 billion in 1993.

Washington leads the Northwestern United States in manufacturing shipments and manufacturing value added at \$8.8 billion and \$3 billion respectively in 1992. Washington employed over 36,000 people in over 600 establishments in 1992. As a percentage of Washington's total manufacturing value added, food and kindred products (which includes beverages) comprise roughly 10% in 1992, compared to 13.4% of total manufacturing value added in Alberta in 1993.

Food processing is comprised of several sub-sectors that can be categorized into the following groups:

- Meat & poultry products - this is the largest contributor to the industry. Many large operations in this sub-sector have undergone rationalization into more fully integrated processing plants.
- Dairy - this category contains milk and cream, ice cream, yogurt, cheeses, butter and miscellaneous cultured and non-cultured items. Competition is affected by national marketing boards and production quotas.
- Canola Oil - this category includes cooking oil, margarine, shortening, salad oils and feed products such as canola meal and cake. In response to concerns that the US is the prime location for refining due to low per unit costs, Alberta manufacturers have created a strategy to market high-profit, value added products instead of shipping low-profit, bulk commodities to the US for crushing and refining.
- Bakery - this category includes bread, pastries, doughnuts, cakes, muffins, frozen dough and pastry products for local retail and food service markets. Two areas that show promise are export of bakery mix products and local niche markets for health and nutrition conscious consumers.

- Other - this category is a "catch-all" for flours, prepared cereals, pancake mixes, non-canola feeds, pasta, honey, candies and specialty foods.

Major food companies in Alberta include Beatrice Foods, Canbra Foods, Cargill Foods, and XL Foods.

BEVERAGE INDUSTRY

The beverage industry in Alberta accounted for \$608 million worth of manufacturing shipments in 1995 and approximately \$275 million in manufacturing value added in 1993.

Alberta's beverage industry contributed \$608 million in manufacturing shipments in 1995. This is second only to BC's shipments of \$677 million in 1995. The beverage industry accounted for \$275 million in manufacturing value added in 1993, second again to BC which had \$307 million in value added. There were 2059 people employed in 31 beverage processing establishments in Alberta in 1993. Again, BC has a larger employment base and number of establishments at 2600 and 29 respectively. Alberta has experienced the greatest percentage increase in beverage shipments between 1988 and 1995 at 46%. By 1995, there were 39 establishments operating in the Province.

Comparisons to the Northwestern US beverage industry is not presented as the SIC classifications for American industries include beverages as part of "food and kindred products".

There are four sub-sectors in the beverage industry: brewing, distilling, wine and non-alcoholic beverages.

- Brewing - this sub-sector includes Canadian beers, licensed US beers, low-alcohol and dry beers, draught, malts and ales. The newest product innovation in this sub-sector is alcohol-free beers in response to consumer trends toward lighter and lower calorie alcoholic beverages.
- Distilling - this sub-sector includes whiskey, gin, vodka, rum, liqueurs, coolers and light spirits. In response to the consumer trend mentioned above, lower alcohol spirits containing 27% instead of 40% alcohol have enjoyed success.
- Wine - this sub-sector is relatively small in Alberta and specializes in dessert and sparkling wines, coolers and ciders. Recently relaxed provincial trade regulations have increased competition for Alberta operators with less expensive sources now available.

- Non-alcoholic - this sub-sector includes major soft drink producers and food processors who provide generic and private label brands of soft drinks, frozen and packaged juices and fruit drinks. Smaller, local operators produce bottled water and sparkling juice products. Consumer tastes are driving producers to develop products that contain less salt, less sugar and also are driving producers to increase variety. Producers of mineral water products are beginning to examine international markets on the strength of Canada's reputation for pure and clean water.

Chemical And Chemical Products Industries

Alberta's chemical and chemical products industries contributed \$5.0 billion in manufacturing shipments and approximately \$1.9 billion in manufacturing value added in 1995.

The chemical and chemical products industry in Alberta is one of the Province's strongest sectors. It is dominated by petrochemicals and petrochemical products produced in world-class plants.

Alberta leads all Western provinces in manufacturing shipments at \$5.0 billion in 1995 with BC second at \$1 billion. Alberta has increased shipments of chemical products by 44% between 1988 and 1995.

Chemical and chemical product manufacturers in Alberta contributed \$1.5 billion in manufacturing value added in 1993. BC ranked second with \$429 million. The number of chemical products establishments in Alberta and BC was similar in 1993 at 113 and 102 respectively. However, Alberta has more world-class plants which employ over twice as many individuals (7000) as compared to BC (3200).

In 1992, Washington's manufacturing shipments were \$2.7 billion with manufacturing value added of \$1.9 billion or almost 7% of the state's total manufacturing value added. There are over 14,000 people employed in over 200 chemical industry establishments in Washington, ranking ahead of Alberta in terms of employment.

There is a discrepancy between shipments compared to value added between Alberta, BC and Washington. Alberta's ratio between shipments and value added is 2.3:1. BC's ratio is 1.9:1 and Washington is 1.4:1. Alberta's manufacturing value added is low relative to manufacturing shipments as compared to the other jurisdictions.

The chemical and chemical products industry has the following sub-sectors:

- Petrochemicals - this sub-sector produces organic chemicals from natural gas. Most production is based on ethane extracted from natural gas and converted into derivatives. These derivatives are upgraded into intermediates such as styrene and polymer resins including polyethylene, polyvinyl chloride and polystyrene. Most of these products are exported (about 90%).
- Chemical fertilizers - this sub-sector produces nitrogen fertilizers from ammonia found in natural gas. It is further converted into urea, ammonium phosphate, ammonium nitrate, ammonium sulphate and nitrogen solutions. This sub-sector serves western Canadian markets and the Northwest and North-Central US.
- Industrial inorganic chemicals - this sub-sector produces commodity chemicals such as carbon, chlorine, caustic soda, hydrochloric acid and sulphuric acid.
- Specialty chemicals - this sub-sector consists of pharmaceuticals, paints and varnishes, soaps and cleaning compounds. This area is limited to niche markets in Alberta.

Major chemical, petrochemical and fertilizer producers in Alberta include Dow Chemical, Novacor Chemicals, Rhone-Poulenc, Shell Canada Chemical, Sherritt and Union Carbide.

Alberta's chemical and chemical products industries are export oriented with 45% of manufacturing shipments destined for US, Japanese and Pacific Rim markets in 1993 (57% in 1995).

The chemical and chemical products industries experience severe fluctuations in price and demand. This is attributed to mismatched investment to demand cycles due to the long construction periods required to build world-class facilities.

Chemical producers are becoming more proactive in adhering to environmental and safety regulations. Members of the Canadian Chemical Producers' Association have committed to Responsible Care, an environmental and safety quality program. This program is a response to heightened social expectations throughout manufacturing and reflects efforts to avoid forced compliance and legal action in the future.

Refined Petroleum And Coal Products Industries

Refined petroleum and coal products contributed \$3.8 billion in manufacturing shipments and approximately \$295 million in manufacturing value added in Alberta in 1995.

Alberta led Western Canada in manufacturing shipments of petroleum and coal products in 1995 with \$3.8 billion. BC was second in manufacturing shipments at \$1.2 billion. (Statistics were not available for Manitoba and Saskatchewan for proprietary reasons.) Between 1988 and 1995, Alberta's refined petroleum and coal products industries grew by 31.3%, compared to a 16% decrease in BC for the same period.

In 1993, manufacturing value added for Alberta producers was \$247 million. It is important to note that despite being half the size of Alberta in terms of shipments of refined petroleum products, BC led the Western provinces in manufacturing value added with \$431 million in 1993.

Alberta had 20 petroleum and coal producing establishments operating with over 2800 employees in 1993. This compares with 13 establishments and approximately 980 employees in BC's refined petroleum and coal industry. Employment is concentrated in large refineries. By 1995, Alberta had \$295 million in manufacturing value added.

Washington and Utah constitute the strongest presence in the Northwestern US in petroleum and coal products. Washington had the highest manufacturing shipments in 1992 at \$4.2 billion. Utah had the highest manufacturing value added in 1992 with \$340 million. Washington was the largest employer in the region with 29 establishments and 2500 employees. As a percentage of total manufacturing value added, Washington's petroleum and coal products industry contributed 1.2% while Utah contributed almost 5% in 1992. In comparison, Alberta's refined petroleum and coal products industry contributed 3.3% as a percentage of total manufacturing value added in 1993.

As of 1992, in Alberta the refined petroleum and coal sector consisted of five refineries operated by Esso, Petro-Canada, Shell Canada, Husky Oil and Parkland Refining. These refineries produce a full line of products such as gasoline, diesel fuels, jet fuel, asphalt, heavy fuel oils, and lubricants. Esso and Petro-Canada represent over 70% of Alberta's production capacity in this industry.

Alberta exports over \$2.0 billion of its refined petroleum and coal products. Low crude oil prices have resulted in capital expenditure cuts and a focus on cost reduction and quality improvement in Alberta's refined petroleum and coal products industries. Environmental factors have influenced the market. Global warming has caused an increase in the use of propane fuel as an effective competitor to high carbon fuels.

Wood Industries

Alberta's wood industries accounted for almost \$1.6 billion in manufacturing shipments and \$704 million of manufacturing value added in 1995.

Alberta's manufacturing shipments by wood industries have increased by 100% over 1988 to 1995 to \$1.6 billion. Although BC has a considerably larger wood products industry with total manufacturing shipments of \$10.4 billion (BC ranks first in terms of value added, shipments and employment among the Western provinces), the industry has not grown at the rapid pace found in Alberta. Between 1988 and 1995, shipments by wood industries in BC increased by 50%.

Manufacturing value added in Alberta's wood industries was \$730 million in 1993 as compared to BC's leading position at almost \$4 billion. This ranks Alberta favourably in terms of the ratio of shipments to value added when compared to BC. In 1993, Alberta employed over 7600 people in 348 establishments across the province compared with almost 12,000 people in BC. Most of these establishments are sawmills. In 1992, seventeen of these sawmills accounted for over 80% of total lumber production. By 1995, Alberta had 358 establishments. Manufacturing value added for Alberta is estimated at \$704 million for 1995.

Oregon led the Northwestern US in manufacturing shipments and manufacturing value added in 1992, at \$9.5 billion and \$3.3 billion respectively. There were over 2,000 establishments employing over 51,000 employees in Oregon's wood industry in 1992. The wood industry contributed almost 23% of Oregon's total manufacturing value added in 1992.

There are two main categories in Alberta's wood industries: lumber production and panelboard production.

- Lumber production - this sub-sector is the dominant force in the wood industry. Lumber production deals almost exclusively in softwood (spruce, pine, fir) and produces primarily construction grade products. Canada enjoys a strong export position, providing lumber products to the US, the Pacific Rim and Western Europe. However, US tariffs have affected profitability for many sawmills shipping to the US and as a result, more focus is being placed on lucrative offshore markets.
- Panelboard production - this sub-sector is focused on oriented strandboard (OSB) and medium density fibreboard (MDF) used in construction and furniture industries. Alberta was the site of Canada's first OSB plant. About 85% of Alberta's OSB product

is shipped to the US. About 40% of MDF products are exported to the US and overseas.

The sub-sectors that are driving growth in Alberta's wood industries are "sawmill & planing mill industries" with manufacturing shipments of over \$744 million in 1993 and "sash, door & other millwork industries" with almost \$297 million in shipments in 1993. Both sub-sectors have grown in shipments and value added over 1990 to 1993.

Growth in consumption has been slow due to the maturity of the industry and introduction of alternate building materials such as metal studs, prefabricated concrete, polyvinyl chloride window frames and metal and glass doors. Despite this indicator of a static market, there are several trends that will affect wood industries:

- softwood lumber trade will continue to be driven by demand for construction grade products;
- New Zealand and Chile have introduced new, lower grade products now available in Western European markets;
- with a rise in engineered wood structures, wood manufacturers are feeling increased pressure to use flexible, precision production techniques to provide wood products made to specifications;
- there is a shift away from providing raw materials to providing pre-cut materials for re-manufacture; and
- new products, using combinations of wood fibre and other products, have been introduced to stimulate new demand.

These trends indicate that there are two directions for operators to take in Alberta. Wood manufacturers can focus on cost minimization through developing more efficient plants, or focus on new products/markets with specialty operations in niche markets.

Fabricated Metal Products Industries

Fabricated metal products in Alberta accounted for \$1.5 billion in manufacturing shipments and \$614 million in manufacturing value added in 1995.

Alberta has a fabricated metal products industry similar in size to British Columbia. Alberta's manufacturing shipments of \$1.5 billion compared favourably to BC's \$1.6 billion in 1995. Alberta experienced 53% growth between 1988 and 1995. BC grew by 37%.

Alberta is second to BC in terms of fabricated metal products **manufacturing value added**. Alberta, at \$540 million was \$100 million behind BC at \$640 million in 1993. Saskatchewan and Manitoba were not a strong presence in this industry during the 1988 to 1993 period, and actually experienced a decline in shipments.

Employment in Alberta's fabricated metals was almost 10,000 employed in almost 400 **establishments** in 1993. Alberta ranked second to BC which employed 10,500 individuals in over 500 establishments. Most of the establishments are small, with under 100 people. In 1992, 87% of Alberta firms in the fabricated metal products industry had under 50 people employed in full-time jobs. By 1995, Alberta had an estimated manufacturing value added of \$614 million.

Washington led the Northwestern US in fabricated metal industries in 1992. Manufacturing shipments were \$1.5 billion and manufacturing value added was \$690 million or 2.5% of total manufacturing value added for Washington in 1992. In the same year, there were over 600 establishments employing 11,500 employees.

The fabricated metal products sector consists of firms that add value at a secondary stage to metal manufacturing. Alberta's fabricated metal products industries include fabricated structural and architectural metal products, fabricated tubular steel products, metal closures and containers, wire products, hardware, heating ventilation, air conditioning products and other fabricated metal products.

- Fabricated structural metal products - this sub-sector makes storage tanks and pressure vessels, prefabricated buildings, concrete construction forms and structural shapes primarily for the oil and gas industry.
- Hardware and tool industries - this sub-sector produces fabricated pipe, couplings and fittings and oil field tools and hardware for the oil and gas industry.
- Stamped, pressed and coated metal products - this sub-sector is focused on fabrication of nickel products for export markets.
- Other fabricated metals - this sub-sector includes producers of metal drums, cylinders, kegs, pails and cans mostly for the Alberta market. Firms in this sub-sector also produce wire springs, wire rope and slings, screens and wire cloth and wire chain links for construction and consumer markets. Heating and ventilation and air conditioning manufacturers produce mostly for industrial uses.

The sub-sectors that contributed the most to the fabricated metal products industry between 1990 and 1993 were "stamped pressed and coated metals" and "fabricated structural metal products", with \$277 million and \$228 million respectively in manufacturing shipments.

Alberta exports fabricated metal products mostly to the US and oil producing nations, as well as to markets in the European Community.

Because the fabricated metal products industry depends on the oil and gas industry as its primary market, it is subject to the same cyclical influences. In the short term, firms are focusing on accessing international markets as a key strategy. Another strategy considered is new product development in non-wood construction materials. A spin-off that could be generated from the fabricated metal products industry is the manufacture of machinery and equipment required in fabricated metal industry processes.

Paper And Allied Products Industries

Paper and allied products contributed \$2.3 billion in manufacturing shipments and approximately \$483 million in manufacturing value added to Alberta's economy in 1995.

Alberta's paper and allied products industries shipped \$2.3 billion in product second only to BC (\$7.2 billion) in manufacturing shipments of the Western provinces in 1995. Alberta experienced a 270% increase in shipments from 1988 to 1995 (BC grew only 26%).

Alberta paper and allied products firms contributed \$400 million in manufacturing value added, second to BC with \$1.2 billion in 1993. Alberta firms in this sector employed over 3400 people in 32 establishments in 1993. BC is the largest employer in this sector in Western Canada with almost 17,500 people employed in 66 firms. By 1995, Alberta had 52 establishments and an estimated \$483 million in manufacturing value added.

Washington had the strongest presence among the Northwestern states in paper and allied products industries in 1992 with \$4.4 billion in manufacturing shipments and \$1.6 billion in manufacturing value added (almost 6% of Washington's total manufacturing value added). This sector had over 110 establishments employing over 16,000 individuals in Washington in 1992.

Alberta's paper and allied product industry is comprised of two major groups: pulp and paper operations and converted or value added paper operations. Large companies outnumber small ones and account for the bulk of the industries' employment.

- Paper, newsprint and paperboard industries - this category contains companies that manufacture different grades of paper depending on the end user. Most paper produced is consumed by North American, Western European and Japanese markets. With the introduction of low cost plantation timber from emerging suppliers, world market share and trading patterns will certainly be affected.
- Pulp industry - this category produces newsprint and pulp for use in manufacturing paper products. New pulp types are coming to the fore to compete with traditional softwood kraft paper (e.g. hardwood kraft, softwood and hardwood and chemi-thermo-mechanical-pulp or CTMP).

Alberta producers are experiencing a trend toward regional specialization based on comparative cost advantage.

Machinery Industries

Alberta's machinery industry contributed almost \$1.2 billion in manufacturing shipments and approximately \$529 million in manufacturing value added in 1995.

Manufacturing shipments for Alberta's machinery industry (\$1.19 billion) ranks first among the Western provinces. Saskatchewan and Manitoba experienced the greatest percentage increase in shipments from this sector over the 1988 to 1995 period with 114% and 111% growth respectively. A dip in shipments in the early 1990's was due to the weak oil and gas market.

Alberta also led the Western provinces in **manufacturing value added** in this sector with \$482 million in 1993. There were a total of 190 establishments in Alberta with over 7500 employees in 1993. Most of these machinery operations are small with under 100 people employed per establishment.

Colorado was the greatest presence in the Northwestern US for machinery industries in 1992. Manufacturing shipments were \$4.1 billion with manufacturing value added of \$2.3 billion or over 15% of Colorado's total manufacturing value added. However, Washington had more establishments and employees in machinery industries in 1992.

Machinery industries in Alberta produce machines and parts for oil and gas, agriculture, forestry, mining and construction sectors. Because this industry depends on cyclical industries for its livelihood, companies in this sector tend to be subject to the same downturns and upswings as the industries they supply.

- Oil and gas field machinery - this sub-sector produces exploration equipment, drilling and well service equipment and production equipment. Alberta's exports in this area are to OPEC countries, the former Soviet Union and US.
- Agricultural implement industries - this sub-sector produces cultivators, threshers, mowers, balers, harrows, ploughs and sprayers for Canadian and US markets.
- Construction machinery - this sub-sector produces graders, levellers, mobile cranes and concrete mixers and loaders.
- Mining equipment and machinery - this sub-sector produces excavating machinery, coal and rock cutters, grinders, crushers and sorters, as well as furnaces. This sub-sector is noted for flexible, short and small run producers who fit their operations to the custom nature of mining.
- Other industry specific equipment - this sub-sector produces parts and equipment for rolling mills, forging and die-stamping machinery and metal-working equipment. There is a strong domestic focus in this industry sub-sector.

Most of Alberta's machinery exports go to the US, oil producing nations, Europe, the Pacific Rim and the former Soviet Union.

There are opportunities in joint ventures with international partners in the machinery industry. These ventures could create market networks and help Alberta firms to explore technologies not presently available in Alberta.

Because the machinery industry depends heavily on the oil and gas industry, operators have become efficient and competitive through constant exposure to uncertainty. Precision tooling and quality control are standards for operations that require flexibility and responsiveness. Some Alberta firms have made technological innovations that are now accepted as world-wide standards.

The industry sub-sectors that have driven growth in the machinery industry are primarily "other machinery and equipment industries", "construction and mining machinery" and "compressors pumps and industrial fans".

Transportation Equipment Industries

Transportation equipment industries in Alberta contributed \$394 million in manufacturing shipments and approximately \$194 million in manufacturing value added in 1995.

Alberta's transportation equipment industries, with manufacturing shipments of over \$394 million in 1995, have shown the greatest increase in shipments over the 1988 to 1995 (73% growth) period for this sector compared to other Western provinces. BC led the transportation equipment industry with \$1.2 billion in manufacturing shipments in 1995. Manitoba was second at almost \$959 million.

Alberta transportation equipment manufacturers contributed \$169 million in manufacturing value added in 1993. Manitoba led in this category as well, with \$427 million in value added for 1993. There were 3100 employees working in 66 establishments in Alberta in 1993, compared to almost 7,000 individuals in 56 establishments in Manitoba. By 1995, Alberta had an estimated \$194 million in manufacturing value added.

Of the Northwestern US, Utah had the highest manufacturing value added in the transportation equipment industry in 1992 at \$1.3 billion or 18% of the state's total manufacturing value added. Shipments were not available.

Transportation equipment manufacturers in Alberta mainly produce truck boxes and vehicles for construction, mining, oil and gas, and agriculture industries. Because of Canada's population distribution and established Eastern manufacturing centre, it is unlikely that Alberta will become a player in the car/auto manufacturing industry.

There is an opportunity for producing large trucks in Alberta. With the disappearance of the Crow rate there may be increased demand for large trucks, as trucking may become more economically feasible for agricultural and other products.

The Alberta transportation equipment industries also include aerospace and aircraft parts such as electronics, advanced composites, graphites, defence systems and components for jet engines; CAE Aviation, Hughes Aircraft, and Pratt & Whitney are key manufacturers.

Electrical And Electronic Products Industries

Alberta's electrical and electronic products industries contributed almost \$1.3 billion in manufacturing shipments and approximately \$387 million in manufacturing value added in 1995.

Manufacturing shipments for Alberta's electrical and electronic products industry, at \$1.3 billion in 1995, led the Western provinces for this sector. BC ranked second at \$884 million. Alberta experienced a 277% growth in manufacturing shipments between 1988 and 1995. This growth was the largest for any of the SIC manufacturing sectors as well as the largest in the Western provinces.

Manufacturing value added for this industry in 1993 was \$314 million, approximately the same as BC. Alberta has over 4600 employees working in 72 electrical and electronic products establishments in 1993. Most of these establishments were comprised of under 20 people. The next closest province in terms of electrical shipments, BC, employed almost 5,400 employees in 136 establishments in 1993.

Oregon was the greatest presence in electronics in the Northwestern US in 1992 with \$2.6 billion in manufacturing shipments and \$1.7 billion in manufacturing value added (almost 12% of Oregon's total manufacturing value added). There were over 270 establishments employing over 16,000 people in Oregon's electronics industry in 1992.

This electrical and electronic products sector in Alberta is made up of companies that manufacture telecommunications equipment and components, instruments and process control products, electronic equipment and components, computing equipment and household appliances.

- Telecommunications - this sub-sector deals with manufacturing and sales of cellular telephone operating systems and telephone systems accessories, data distribution and interface equipment, radio and satellite tracking and receiving devices, switching equipment and synthetic aperture radar (SAR) equipment.
- Instruments and process control products - this sub-sector produces test/measurement/control electronics for oilfield, environmental and geophysical applications.
- Electronic equipment and components - this sub-sector produces items such as traffic control equipment and signalling and simulation equipment.

Northern Telecom is a major telecommunications manufacturer, and Hewlett Packard is a major computer manufacturer, in Alberta.

Exports for the electrical and electronic products industries go primarily to the US, United Kingdom and Hong Kong. Alberta is known for its strong telecommunications industry, as well as oil and gas field equipment electronics, office automation, supervisory control, data acquisition systems and thermoelectric power generators.

Product life cycles in the electronics industry are relatively short. This drives a strategy of constant innovation through the use of design teams and flexible manufacturing systems. For some products, since the technology matured, there is an increased focus on marketing and providing support services for the products.

The electrical and electronic products industry's global network has blurred traditional product lines and geographic market segments.

Other Sector Highlights

There are a number of other sectors to include to create a complete picture of Alberta's manufacturing industries. We have included these sectors, but with less analysis, as they contribute to Alberta's economy on a smaller scale at present.

Furniture And Fixtures Industries

In 1995, Alberta's furniture and fixtures industry had manufacturing shipments of \$327 million and an approximate manufacturing value added of \$160 million.

There are two main sub-sectors in the furniture and fixtures industry:

- Household furniture industries - this sub-sector manufactures wooden, metal or upholstered furniture for Alberta and Canadian markets. Growth in this industry reflects the changing demographics in Canada. For example, more "baby boomers", an ageing population and smaller family size influence what is produced. The recent trend is toward knock-down and ready-to-assemble furnishings. Competition is based on price, quality, service and design. Asian and European imports have affected domestic operators. Because of their lower wage rates and large-scale plants, these imports are cheaper.
- Office furniture industries - this sub-sector manufactures furniture in metal, wood and other materials for corporate, government and institutional markets. Office furniture manufacturers have close relationships with their customers. This sub-sector is less cost competitive than its US counterpart which enjoys lower costs of production. Presently, Canadian office furniture manufacturers are developing a North American market in an attempt to achieve economies of scale.

Mexico is becoming a competitor in Canada's exports to the US in furniture and fixtures. In 1990, imports from Mexico to the US were 6% of total furniture and fixture imports in the US. This was a 24% increase over the previous year. Canada's portion of US furniture and fixture imports in 1990 was 12%.

Printing, Publishing And Allied Industries

Printing, publishing and allied industries in Alberta had manufacturing shipments of \$897 million and contributed manufacturing value added of approximately \$585 million in 1995.

Alberta ranked second to BC in 1995 manufacturing shipments in printing, publishing and allied industries, at \$896 million as compared to BC's \$1.1 billion. Both provinces experienced similar growth rates in shipments at roughly 23%.

There are three major sub-sectors in this industry: newspapers and periodicals, books and commercial printing.

- Newspaper and periodical publishing - this sub-sector involves the gathering of and preparation of news articles and editorials, selling advertising, and preparation of advertisements and distribution. The newspaper sub-sector is locally focused with little international trade. Technology has influenced some of the larger publishers in terms of quality and cost control.
- Books - this sub-sector produces a wide variety of publications from academic and trade books to literary and children's books.
- Commercial printing - this sub-sector produces a variety of materials for all industries. Most production is custom work, for example catalogues, circulars and price lists. Most of Alberta's printing production remains within Alberta.

Primary Metal Industries

Alberta's primary metal industries contributed \$1.1 billion in manufacturing shipments and approximately \$269 million in manufacturing value added in 1995.

Alberta's primary metal industries at \$1.1 billion in manufacturing shipments in 1995, led the Western provinces. BC ranked second at \$1.0 billion. Alberta experienced a 2.1% decrease in manufacturing shipments between 1988 and 1995.

Manufacturing value added for this industry in 1993 was \$262 million, second to BC at \$385 million. Alberta's estimated manufacturing value added for 1995 was \$269 million.

Firms operating in the primary metal industry produce primary rolling-mill products, steel pipe and tubular goods, iron and steel castings, and extruded products. The Province's primary metal industries are dominated by large firms with 80% of employment in the industry provided by 20 Alberta firms.

There are three sub-sectors in primary metal industries:

- Steel pipe and tube industry - this sub-sector is dominated by three large firms: Stelco, IPSCO/Western Canadian Steel and Prudential Steel. Despite low levels of drilling activity due to low

oil and gas prices, there is still a thriving market for well casings and transmission pipe for the continued expansion of natural gas pipeline capacity from Canada to the US.

- Primary nickel and cobalt production - this sub-sector is represented by one company in Alberta - Sherritt. This firm exports to markets in the US, Europe and Japan. Cobalt produced by Sherritt goes to world-wide markets as this is one of only two cobalt producers in Canada.
- Other primary metal production - small and medium-sized foundries constitute this sub-sector which produces ductile and grey iron castings.

Leaders in the primary metal industry use state of the art technology to improve quality, efficiency and compliance to increasingly strict environmental regulation. For example, close loop circuits and recycling systems are two ways of reducing or eliminating contaminants in the manufacturing process.

Most goods produced remain in North American markets and are vulnerable to transportation costs and variability in exchange rates and commodity prices. The primary metal industry is closely tied to the oil and gas industry, and thus has cyclical trends reflecting oil and gas prices.

Non-Metallic Mineral Products Industries

The non-metallic mineral products industry in Alberta contributed \$781 million in manufacturing shipments and approximately \$439 million in manufacturing value added in 1995.

Alberta's non-metallic mineral products industries at \$781 million in manufacturing shipments, was second to BC at \$893 million.

Alberta's non-metallic mineral manufacturers produce cement, ready-mix concrete and concrete products, gypsum, fibre insulation and clay products for the construction industry. Most firms are small with under 50 full-time employees. The non-metallic mineral products industry experiences the same cyclical swings as the construction industry.

There are five sub-sectors in the non-metallic mineral products industry:

- Cement, ready-mix and concrete products - this sub-sector is dominated by two major producers of ready-mix and pre-cast products - Canada Lafarge and Inland Cement. The combined

capacity of these two firms is almost 2 million tons. Their market for these products is in North America.

- Gypsum - producers in this sub-sector are mostly small scale plants that produce gypsum drywall.
- Ceramic clay products - companies in this sub-sector produce building and facing brick, ceramic sewer pipe and chimney inlay materials for the Canadian market. This sub-sector is dependent upon housing construction and thus production reflects housing starts.
- Fibre insulation - Alberta has two major insulation producers for residential and industrial construction industries.
- Lime production - Quicklime and lime derivatives are produced in Exshaw and Coleman, Alberta for use in steel production and pulp and paper, and for fertilizer, insecticide and glue production. A large portion of products are exported to the US.

Plastic Products Industries

Alberta plastic products companies contributed \$414 million in manufacturing shipments and \$142 million in manufacturing value added in 1995.

Most of the 300 firms in the plastic products industry use synthetic resins to mould, extrude or fabricate basic plastic products including foamed and expanded shapes/forms; plastic pipe fittings; film sheeting; plastic bags; and bottle and containers. There are a large number of small scale operations producing a wide variety of products in Alberta.

The largest cost for plastic products producers is raw materials. Sourcing the lowest cost materials is a competitive factor for these firms. Transportation and labour are also key competitive issues for plastic products industries. The plastic products industry is closely tied to construction, packaging and electronics companies.

Waste and disposal are issues that are prevalent for plastic products industries. Environmental issues such as recycling and reducing are having a competitive impact on firms. These issues drive constant innovation in designing materials that are more environmentally acceptable.

The main markets for plastic products are Western Canada and the Northwestern US.

The Alberta Industrial Polymer Centre (AIPC), now in its formative stages, is a virtual organization linking resources of universities, colleges, Alberta Research Council and industry. AIPC assists in polymer research, product and process development, and efficiency/competitiveness enhancement.

Although there are a large number of small scale operators producing a wide variety of products in Alberta, the plastic products industries continue to grow. Alberta experienced the highest growth among the Western provinces from 1988 to 1995 at 43%. Dow Chemical, DuPont, Union Carbide, Geon Vinyl, AT Plastics, ZCL Composites, Greenfield Plastics and SPM/A Dynacast Company are examples of major plastic manufacturers in the Province.

Other Manufacturing Industries

CLOTHING AND TEXTILES

For purposes of simplifying our sector descriptions, we have grouped clothing, textile products, primary textiles and leather and allied products together under the category "clothing and textiles". This is a small but potentially emerging industry in Alberta, especially the clothing sub-sector. In 1995, clothing had manufacturing shipments of \$152 million and manufacturing value added of approximately \$96 million. Textile products were \$47 million in shipments and \$24 million in value added in 1995. Primary textiles data was not available. Leather and allied products were \$35 million in shipments and approximately \$12 million in value added in 1995 in Alberta.

Levi Strauss is an example of a major successful clothing manufacturer in Alberta.

TOBACCO

This sector was not represented in the data for Alberta.

RUBBER PRODUCTS

This sector was not represented in the data for Alberta.

OTHER MANUFACTURING INDUSTRIES

Other manufacturing industries in Alberta had \$286 million in manufacturing shipments and approximately \$193 million in manufacturing value added in 1995. Other manufacturing industries include:

- scientific and professional equipment;
- indicating and recording instruments;
- other instruments, related products;
- ophthalmic goods;
- jewellery and precious metals;
- sporting goods ;
- sign and display; and
- other products.

Manufacturing Drives Alberta's Economy

Manufacturing in Alberta contributed roughly 7.7% to GDP in 1993 and 10.1% in 1994. Manufacturing industries employed 8.0% of the total workforce and accounted for 7.1% of the capital investment in Alberta in 1995. Alberta manufacturers draw on resources from many other sectors and thus drive the economy. It is one of the most important elements of economic growth in Alberta. Export development continues to be a goal for Alberta manufacturers as they explore and create new markets in the US, United Kingdom, Europe, the Pacific Rim and OPEC countries. The recent world-wide trend toward market liberalization enhances this opportunity.

There are several manufacturing industries that have been highlighted as top performers in Alberta's economy. Many of these are resource-based and enjoy international market success. There is also ample opportunity for non-resource based and technology-driven manufacturing in Alberta due to the presence of numerous research bodies and educational institutes.

There are several factors that come together to create a very favourable commercial environment in Alberta. These factors have become known as the "Alberta Advantage". The "Alberta Advantage" for manufacturing industries is achieving the most competitive position through favourable business inputs and costs. The following is a synopsis of these elements.

Abundance Of Natural Resources

Alberta has a wealth of natural resources including mineral, oil and gas deposits. Alberta's forests provide a base for a thriving wood products industry. Water, a crucial element in food production and processing, is readily available and enhanced with the development of an extensive irrigation system. There are no signs of water shortage in the near future.

Exceptional Human Resources

Over 40% of the Alberta population hold a post-secondary certificate, diploma or university degree. Alberta has the most productive workforce in Canada based on per capita GDP. Alberta also has one of the best labour records in Canada based on workdays lost due to strikes.

The low cost of living, favourable tax regime and variety of educational and recreational opportunities, facilitates the attraction of skilled resources to Alberta.

Excellent Infrastructure

Alberta has the lowest gas and electricity rates in North America. Outbound transportation costs are among the lowest in Canada and the Northwestern US. Alberta is quickly becoming the warehousing and distribution centre for Western Canada. There is a strong research and development presence in the Province, with the Alberta government spending more per capita on R&D than any other province. There are also a variety of recognized advanced education institutes, ranging from universities to technical institutes to community colleges.

Favourable Tax Climate

Alberta is the only province that does not levy a provincial sales tax. The Province has the lowest gasoline fuel tax in Canada. Alberta's corporate tax rates are lower than many provinces and the Province's marginal personal income tax rate is the lowest in the country. There are also no payroll or general capital taxes in Alberta.

The profile of manufacturing in this document indicates that Alberta is second to BC in the Western provinces in terms of total manufacturing shipments. However, Alberta leads in a significant number of sectors in terms of shipments.

Below, we have outlined some challenges and opportunities for Alberta's manufacturing industries and for the Province to consider in developing a strategy to attract manufacturing companies to Alberta.

Top Challenges

- Increase value added component of resource based manufacturing - Alberta leads in many sectors when activity levels are measured in terms of shipments but lags in manufacturing value added. This likely occurs because Alberta exports many resources in a semi-processed state - the opportunity for further processing within the Province should be examined.
- Change mindset from local to global competition - Alberta has a number of domestic manufacturers who have established a strong local market presence as a result of applying advanced technologies, developing new products and new processes, and are therefore well positioned to tackle the export market. The challenge is to provide the impetus to expand to global markets.
- Focus on product R&D not process R&D - There has been some criticism that Canada spends more research money on process rather than product. By creating more new products and supporting entrepreneurs who are willing to introduce new products, Alberta would be breaking this tradition.
- Learn collaboration/partnering instead of competing locally - As part of the global competitive marketplace, Alberta manufacturers must learn to collaborate with other provinces and states to create an international presence.

Top Opportunities

- Alberta's top opportunity is to capitalize on the comparative overall cost advantages in serving the manufacturing industries' target markets.
- Technology - biotechnology, IT and advanced materials are quickly becoming the competitive advantages to seek and develop

in manufacturing. Alberta has a strong research and development capability and a presence in technology-based industries. This can be further expanded by exploring/expanding a number of product industry areas where Alberta has leading edge technology, as listed below:

- Cogeneration equipment systems
- Forest industry equipment
- Film and sound production
- Software/Multimedia applications
- Call centres - especially based on Asian market
- Geomatics
- Medical technology
- Non-wood building products
- Electronics
- Biotechnology/Pharmaceuticals
- Environmental services
- Aerospace

Next Steps

- Alberta manufacturers should further develop cluster-based initiatives designed to provide shared resources and costs in a value chain of similar or complementary operations. These clusters provide many benefits in linking educational and research institutes/expertise, well established supplier bases, operational excellence and international marketing experience. The development of strong, integrated clusters will enhance industry competitiveness on an international scale.
- Alberta should work with the other Western provinces to develop strong, integrated, cluster-based industry sectors in biotechnology, IT and advanced materials/manufacturing. Each of the Western provinces has particular strengths in some aspect of each of these sectors - no province has developed all of the components necessary to be competitive internationally. However, each province has complementary strengths that when

combined have the potential to create a strong, Western Canadian Advantage.

- As part of the Province's overall manufacturing strategy, Alberta should develop strategies relating to industry expansion and retention in parallel with strategies for industry attraction.

Conclusion

This profile of Alberta's manufacturing industries indicates that the Province is developing a strong manufacturing base. A number of sectors are particularly strong in terms of size. In particular, Alberta dominates Western Canadian production in

- Food Industries,
- Chemical and Chemical Products Industries,
- Refined Petroleum and Coal Products Industries,
- Paper and Allied Products Industries,
- Wood Products Industries,
- Fabricated Metal Products Industries,
- Electrical and Electronic Products Industries,
- Machinery Industries, and
- Primary Metal Industries.

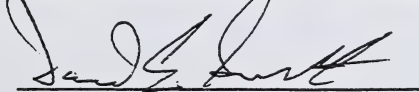
A number of other sectors are experiencing rapid and/or even explosive growth, in particular, Electrical and Electronic Products Industries, Transportation Equipment Industries and Furniture and Fixtures Industries.

To foster additional growth, the Province should work in collaboration with industry players to determine what additional cluster competencies and infrastructure are needed to support and enhance growth of Alberta's strongest performers.

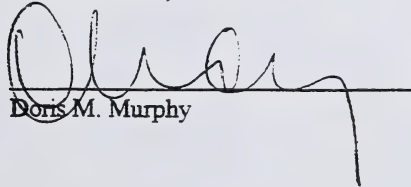
Once strategic priorities for strengthening have been determined, the government's role in facilitating the needed changes can/should be worked out with key industry and institutional stakeholders.

Yours very truly,

COOPERS & LYBRAND CONSULTING



David E. Smith, CMC



Denis M. Murphy

[The following text is extremely faint and illegible due to low contrast and blurring. It appears to be a multi-paragraph document, possibly a letter or a report, with several lines of text visible across the page.]

APPENDICES

Appendix 1

Alberta's Manufacturing Sector Analysis

- (a) Industrial/Non-Resource Manufacturing Industries
- (b) Agricultural Processing Industries
- (c) Energy Based Manufacturing Industries
- (d) Forest Product Manufacturing Industries

A) Industrial/Non-Resource Industries

| Alberta Manufacturing Data: Non-Metallic Mineral Products Industries | | | | | |
|--|-------|-----------|-----------------|----------------|---------|
| SIC 35 | Year | Shipments | Mfg Value Added | Total Employed | # Firms |
| | 83 | 566787 | 295877 | 4501 | |
| | 84 | 490211 | 256546 | 3963 | |
| | 85 | 523422 | 280083 | 3889 | |
| | 86 | 583445 | 307994 | 4223 | |
| | 87 | 602451 | 307851 | 4311 | |
| | 88 | 629698 | 342816 | 4473 | |
| | 89 | 658536 | 351315 | 4511 | |
| | 90 | 665153 | 359930 | 4213 | |
| | 91 | 652245 | 353335 | 4532 | |
| | 92 | 721306 | 409680 | 4206 | |
| | 93 | 746871 | 424758 | 4097 | |
| | 94 | 788395 | 424055 | | |
| | 95 | 781335 | 438819 | | 593 |
| Growth | 88-95 | 24.1% | 28.0% | | |

| Alberta Manufacturing Data: Plastic Products Industries | | | | | |
|---|-------|-----------|-----------------|----------------|---------|
| SIC 16 | Year | Shipments | Mfg Value Added | Total Employed | # Firms |
| | 83 | 151113 | 65207 | 1381 | |
| | 84 | 178482 | 78909 | 1582 | |
| | 85 | 208145 | 94255 | 1735 | |
| | 86 | 237567 | 101524 | 1854 | |
| | 87 | 246331 | 106953 | 1923 | |
| | 88 | 289575 | 110885 | 2028 | |
| | 89 | 295339 | 119165 | 2150 | |
| | 90 | 299633 | 123336 | 2051 | |
| | 91 | 274844 | 120540 | 2135 | |
| | 92 | 264886 | 123491 | 1944 | |
| | 93 | 307037 | 116845 | 2058 | |
| | 94 | 372280 | 136712 | | |
| | 95 | 414270 | 141905 | | 539 |
| Growth | 88-95 | 43.1% | 28.0% | | |

Note: Mfg Value Added 1994-95 is based on a linear trend of 1983-93 actuals. Source: Statistics Canada

A) Industrial/Non-Resource Industries

| Alberta Manufacturing Data: Machinery Industries | | | | | |
|--|-------|-----------|-----------------|----------------|---------|
| SIC 31 | Year | Shipments | Mfg Value Added | Total Employed | # Firms |
| | 83 | 464190 | 235321 | 5008 | |
| | 84 | 543069 | 287553 | 4996 | |
| | 85 | 755676 | 356200 | 6465 | |
| | 86 | 0 | 0 | 0 | |
| | 87 | 599814 | 2679491 | 5842 | |
| | 88 | 761427 | 370307 | 7522 | |
| | 89 | 827808 | 352784 | 7516 | |
| | 90 | 798306 | 364003 | 7088 | |
| | 91 | 784033 | 366614 | 6848 | |
| | 92 | 773864 | 359282 | 6346 | |
| | 93 | 993312 | 482011 | 7506 | |
| | 94 | 1173156 | 529574 | | |
| | 95 | 1189006 | 529146 | | |
| Growth | 88-95 | 56.2% | 42.9% | | |

| Alberta Manufacturing Data: Transportation Equipment Industries | | | | | |
|---|-------|-----------|-----------------|----------------|---------|
| SIC 32 | Year | Shipments | Mfg Value Added | Total Employed | # Firms |
| | 83 | 114218 | 56594 | 1936 | |
| | 84 | 124179 | 71571 | 1958 | |
| | 85 | 139701 | 80151 | 2112 | |
| | 86 | 164329 | 78991 | 2153 | |
| | 87 | 169595 | 83238 | 2277 | |
| | 88 | 227470 | 115479 | 3031 | |
| | 89 | 245727 | 122673 | 3185 | |
| | 90 | 296249 | 152396 | 3648 | |
| | 91 | 284153 | 153382 | 3375 | |
| | 92 | 276308 | 149800 | 3176 | |
| | 93 | 298727 | 168927 | 3141 | |
| | 94 | 357789 | 181956 | | |
| | 95 | 394210 | 193597 | | |
| Growth | 88-95 | 73.3% | 67.6% | | |

A) Industrial/Non-Resource Industries

| Alberta Manufacturing Data: Fabricated Metal Products Industries | | | | | |
|--|-------|-----------|-----------------|----------------|---------|
| SIC 30 | Year | Shipments | Mfg Value Added | Total Employed | # Firms |
| | 83 | 676989 | 347231 | 8718 | |
| | 84 | 614839 | 301343 | 7034 | |
| | 85 | 781393 | 405952 | 8042 | |
| | 86 | 804723 | 404177 | 8336 | |
| | 87 | 794146 | 396348 | 8581 | |
| | 88 | 954941 | 459086 | 9471 | |
| | 89 | 1126092 | 538137 | 11091 | |
| | 90 | 1117584 | 554864 | 10660 | |
| | 91 | 1081799 | 523268 | 10812 | |
| | 92 | 1014693 | 500216 | 9819 | |
| | 93 | 1064792 | 539988 | 9839 | |
| | 94 | 1281078 | 591204 | | |
| | 95 | 1460601 | 614426 | | |
| | | | | | |
| Growth | 88-95 | 53.0% | 33.8% | | |

| Alberta Manufacturing Data: Electrical & Electronic Products Industries | | | | | |
|---|-------|-----------|-----------------|----------------|---------|
| SIC 33 | Year | Shipments | Mfg Value Added | Total Employed | # Firms |
| | 83 | 154370 | 58452 | 2708 | |
| | 84 | 227861 | 103509 | 3324 | |
| | 85 | 306911 | 174936 | 3041 | |
| | 86 | 262856 | 137349 | 3249 | |
| | 87 | 288393 | 139695 | 3363 | |
| | 88 | 344300 | 169347 | 4157 | |
| | 89 | 439674 | 220726 | 4621 | |
| | 90 | 608614 | 316870 | 4647 | |
| | 91 | 653135 | 319664 | 4685 | |
| | 92 | 653806 | 286068 | 4589 | |
| | 93 | 700705 | 313946 | 4665 | |
| | 94 | 1069564 | 360885 | | |
| | 95 | 1298036 | 387085 | | |
| | | | | | |
| Growth | 88-95 | 277.0% | 128.6% | | |

Note: Mfg Value Added 1994-95 is based on a linear trend of 1983-93 actuals. Source: Statistics Canada

A) Industrial/Non-Resource Industries

| Alberta Manufacturing Data: Primary Metal Products Industries | | | | | |
|---|-------|-----------|-----------------|----------------|---------|
| SIC 29 | Year | Shipments | Mfg Value Added | Total Employed | # Firms |
| | 83 | 561936 | 222123 | 3123 | |
| | 84 | 795184 | 330414 | 3656 | |
| | 85 | 865933 | 335850 | 3698 | |
| | 86 | 719448 | 281235 | 3316 | |
| | 87 | 761806 | 302579 | 3190 | |
| | 88 | 1089676 | 358738 | 3734 | |
| | 89 | 1018087 | 293923 | 3563 | |
| | 90 | 873806 | 267212 | 3632 | |
| | 91 | 864810 | 284321 | 3422 | |
| | 92 | 767883 | 247546 | 3053 | |
| | 93 | 900025 | 261651 | 3499 | |
| | 94 | 1156453 | 271865 | | |
| | 95 | 1066446 | 268910 | | 236 |
| Growth | 88-95 | -2.1% | -25.0% | | |

| Alberta Manufacturing Data: Printing, Publishing & Allied Products Industries | | | | | |
|---|-------|-----------|-----------------|----------------|---------|
| SIC 28 | Year | Shipments | Mfg Value Added | Total Employed | # Firms |
| | 83 | 491161 | 333910 | 7987 | |
| | 84 | 520991 | 350324 | 7664 | |
| | 85 | 569167 | 378099 | 7960 | |
| | 86 | 627432 | 395066 | 8376 | |
| | 87 | 641825 | 392086 | 8387 | |
| | 88 | 733871 | 443801 | 9057 | |
| | 89 | 779855 | 474537 | 9456 | |
| | 90 | 771323 | 494284 | 9396 | |
| | 91 | 789374 | 501139 | 9354 | |
| | 92 | 788840 | 525269 | 9142 | |
| | 93 | 781383 | 526793 | 8749 | |
| | 94 | 822389 | 563984 | | |
| | 95 | 896870 | 585023 | | 2451 |
| Growth | 88-95 | 22.2% | 31.8% | | |

A) Industrial/Non-Resource Industries

| Alberta Manufacturing Data: Furniture & Fixtures Industries | | | | | |
|---|-------|-----------|------------------|----------------|---------|
| SIC 26 | Year | Shipments | Mfg. Value Added | Total Employed | # Firms |
| | 83 | 103662 | 52838 | 1679 | |
| | 84 | 98878 | 47194 | 1507 | |
| | 85 | 108220 | 53407 | 1628 | |
| | 86 | 133642 | 61608 | 1907 | |
| | 87 | 165073 | 78542 | 2532 | |
| | 88 | 217365 | 108833 | 2850 | |
| | 89 | 252517 | 123970 | 3212 | |
| | 90 | 240899 | 133521 | 2888 | |
| | 91 | 222588 | 113831 | 2869 | |
| | 92 | 231940 | 115060 | 2547 | |
| | 93 | 254946 | 134352 | 2829 | |
| | 94 | 289510 | 150263 | | |
| | 95 | 327457 | 159804 | | 1091 |
| Growth | 88-95 | 50.6% | 46.8% | | |

| Alberta Manufacturing Data: Clothing Industries | | | | | |
|---|-------|-----------|-----------------|----------------|---------|
| SIC 24 | Year | Shipments | Mfg Value Added | Total Employed | # Firms |
| | 83 | 97866 | 58411 | 1621 | |
| | 84 | 93350 | 56374 | 1527 | |
| | 85 | 95592 | 53786 | 1617 | |
| | 86 | 116495 | 69237 | 1824 | |
| | 87 | 135391 | 79062 | 1843 | |
| | 88 | 139978 | 80579 | 1849 | |
| | 89 | 169937 | 104266 | 2126 | |
| | 90 | 157280 | 84736 | 1955 | |
| | 91 | 134645 | 81490 | 1850 | |
| | 92 | 138547 | 81011 | 1684 | |
| | 93 | 142821 | 78647 | 1641 | |
| | 94 | 137620 | 93729 | | |
| | 95 | 152242 | 96812 | | 2473 |
| Growth | 88-95 | 8.8% | 20.1% | | |

Note: Mfg. Value Added 1994-95 is based on a linear trend of 1983-93 actuals. Source: Statistics Canada

A) Industrial/Non-Resource Industries

| Alberta Manufacturing Data: Textile Products Industries | | | | | |
|---|-------|-----------|------------------|----------------|---------|
| SIC 19 | Year | Shipments | Mfg. Value Added | Total Employed | # Firms |
| | 83 | 65024 | 24684 | 694 | |
| | 84 | 58271 | 25250 | 762 | |
| | 85 | 38698 | 16285 | 599 | |
| | 86 | 43423 | 18129 | 685 | |
| | 87 | 53263 | 20034 | 779 | |
| | 88 | 65606 | 27312 | 1037 | |
| | 89 | 65816 | 26961 | 1028 | |
| | 90 | 66192 | 29595 | 1012 | |
| | 91 | 58168 | 24278 | 975 | |
| | 92 | 45255 | 22038 | 738 | |
| | 93 | 43051 | 21585 | 657 | |
| | 94 | 44241 | 24677 | | |
| | 95 | 47056 | 24909 | | 505 |
| Growth | 88-95 | -28.3% | -8.8% | | |

| Alberta Manufacturing Data: Leather & Allied Products Industries | | | | | |
|--|-------|-----------|-----------------|----------------|---------|
| SIC 17 | Year | Shipments | Mfg Value Added | Total Employed | # Firms |
| | 83 | 0 | 0 | 0 | |
| | 84 | 0 | 0 | 0 | |
| | 85 | 0 | 0 | 0 | |
| | 86 | 0 | 0 | 0 | |
| | 87 | 0 | 0 | 0 | |
| | 88 | 23332 | 9049 | 264 | |
| | 89 | 26581 | 11749 | 277 | |
| | 90 | 24002 | 12010 | 237 | |
| | 91 | 20660 | 8949 | 287 | |
| | 92 | 0 | 0 | 0 | |
| | 93 | 23795 | 11315 | 216 | |
| | 94 | 30739 | 11326 | | |
| | 95 | 35452 | 12410 | | 241 |
| Growth | 88-95 | 51.9% | 37.1% | | |

A) Industrial/Non-Resource Industries

| Alberta Manufacturing Data: Other Manufacturing Industries | | | | | |
|--|-------|-----------|-----------------|----------------|---------|
| SIC 39 | Year | Shipments | Mfg Value Added | Total Employed | # Firms |
| | 83 | 120562 | 62605 | 2511 | |
| | 84 | 135705 | 77458 | 2780 | |
| | 85 | 167420 | 88354 | 2863 | |
| | 86 | 192595 | 97727 | 2851 | |
| | 87 | 185462 | 85072 | 2815 | |
| | 88 | 229942 | 113962 | 3732 | |
| | 89 | 279821 | 136539 | 4252 | |
| | 90 | 297991 | 154142 | 3983 | |
| | 91 | 341581 | 169398 | 4283 | |
| | 92 | 271673 | 153143 | 3611 | |
| | 93 | 271206 | 157758 | 3384 | |
| | 94 | 292211 | 182520 | | |
| | 95 | 285613 | 193301 | | 1616 |
| | | | | | |
| Growth | 88-95 | 24.2% | 69.6% | | |

Note: Mfg Value Added 1994-95 is based on a linear trend of 1983-93 actuals. Source: Statistics Canada

| Alberta Manufacturing Data: Food Industries | | | | | |
|---|-------|-----------|------------------|----------------|---------|
| SIC 10 | Year | Shipments | Mfg. Value Added | Total Employed | # Firms |
| | 83 | 3240600 | 563015 | 12611 | |
| | 84 | 3580769 | 637252 | 11872 | |
| | 85 | 3537632 | 609902 | 12104 | |
| | 86 | 3406318 | 624219 | 11668 | |
| | 87 | 3893997 | 753420 | 12086 | |
| | 88 | 4091410 | 806769 | 12581 | |
| | 89 | 4251106 | 778077 | 13407 | 352 |
| | 90 | 4490515 | 861481 | 13910 | 371 |
| | 91 | 4341416 | 985277 | 14234 | 359 |
| | 92 | 4296604 | 1002904 | 15044 | 360 |
| | 93 | 4783924 | 1003000 | 15284 | 373 |
| | 94 | 5084637 | 1072547 | | 388 |
| | 95 | 5292451 | 1120618 | | 427 |
| Growth | 88-95 | 29.4% | 38.9% | | |

| Alberta Manufacturing Data: Beverage Industries | | | | | |
|---|-------|-----------|-----------------|----------------|---------|
| SIC 11 | Year | Shipments | Mfg Value Added | Total employed | # Firms |
| | 83 | 294978 | 165823 | 2234 | |
| | 84 | 328544 | 181750 | 2107 | |
| | 85 | 334654 | 168198 | 2085 | |
| | 86 | 362060 | 171621 | 2079 | |
| | 87 | 374680 | 178490 | 2038 | |
| | 88 | 417468 | 209710 | 2017 | |
| | 89 | 385187 | 177927 | 1706 | 38 |
| | 90 | 398248 | 206440 | 1356 | 37 |
| | 91 | 441241 | 243802 | 1543 | 37 |
| | 92 | 442238 | 253312 | 2017 | 35 |
| | 93 | 502955 | 275269 | 2059 | 31 |
| | 94 | 564880 | 264542 | | 35 |
| | 95 | 607677 | 274809 | | 39 |
| Growth | 88-95 | 45.6% | 31.0% | | |

| Alberta Manufacturing Data: Refined Petroleum & Coal Products Industries | | | | | |
|--|-------|-----------|-----------------|----------------|---------|
| SIC 36 | Year | Shipments | Mfg Value Added | Total Employed | # Firms |
| | 83 | 4033175 | 391807 | 2196 | |
| | 84 | 4316727 | 350447 | 2981 | |
| | 85 | 5102134 | 852277 | 2844 | |
| | 86 | 3118595 | 442046 | 3575 | |
| | 87 | 3393710 | 447171 | 3548 | |
| | 88 | 2876368 | 423538 | 3398 | |
| | 89 | 3089219 | 287391 | 3668 | |
| | 90 | 3749255 | 480345 | 3945 | |
| | 91 | 3512894 | 445925 | 3170 | |
| | 92 | 3357865 | 379665 | 3069 | |
| | 93 | 3182654 | 247049 | 2808 | |
| | 94 | 3356882 | 313315 | | |
| | 95 | 3777001 | 295028 | | |
| | | | | | |
| Growth | 88-95 | 31.3% | -30.3% | | |

| Alberta Manufacturing Data: Chemical Products Industries | | | | | |
|--|-------|-----------|-----------------|----------------|---------|
| SIC 37 | Year | Shipments | Mfg Value Added | Total Employed | # Firms |
| | 83 | 1747985 | 558388 | 4841 | |
| | 84 | 2096393 | 758436 | 5157 | |
| | 85 | 2543054 | 911835 | 5578 | |
| | 86 | 2555431 | 949542 | 5623 | |
| | 87 | 2741997 | 1121299 | 5403 | |
| | 88 | 3442574 | 1739486 | 5624 | |
| | 89 | 3479554 | 1787242 | 5549 | |
| | 90 | 3311123 | 1531753 | 6229 | |
| | 91 | 3067025 | 1320936 | 6086 | |
| | 92 | 3025087 | 1324560 | 6474 | |
| | 93 | 3391186 | 1481239 | 7000 | |
| | 94 | 4207148 | 1767870 | | |
| | 95 | 4972731 | 1858201 | | |
| | | | | | |
| Growth | 88-95 | 44.4% | 6.8% | | |

| Alberta Manufacturing Data: Wood Industries | | | | | |
|---|-------|-----------|-----------------|----------------|---------|
| SIC 25 | Year | Shipments | Mfg Value Added | Total Employed | # Firms |
| | 83 | 501651 | 217567 | 5418 | |
| | 84 | 539319 | 222625 | 5508 | |
| | 85 | 555886 | 242177 | 5386 | |
| | 86 | 640417 | 294738 | 5668 | |
| | 87 | 729947 | 337071 | 6082 | |
| | 88 | 797723 | 340473 | 6793 | |
| | 89 | 903737 | 397819 | 7084 | 279 |
| | 90 | 933445 | 399684 | 7362 | 298 |
| | 91 | 855726 | 361695 | 6584 | 296 |
| | 92 | 977666 | 435777 | 6655 | 317 |
| | 93 | 1370684 | 730102 | 7622 | 348 |
| | 94 | 1654939 | 646661 | | 353 |
| | 95 | 1595513 | 704491 | | 358 |
| Growth | 88-95 | 100.0% | 106.9% | | |

| Alberta Manufacturing Data: Paper & Allied Products Industries | | | | | |
|--|-------|-----------|-----------------|----------------|---------|
| SIC 27 | Year | Shipments | Mfg Value Added | Total Employed | # Firms |
| | 83 | 380866 | 164740 | 2239 | |
| | 84 | 452048 | 226488 | 2187 | |
| | 85 | 462272 | 204694 | 2264 | |
| | 86 | 453066 | 187926 | 2297 | |
| | 87 | 534642 | 187926 | 2361 | |
| | 88 | 631024 | 344037 | 2479 | |
| | 89 | 676310 | 325977 | 2717 | 42 |
| | 90 | 795494 | 415934 | 2536 | 49 |
| | 91 | 934038 | 353927 | 3580 | 49 |
| | 92 | 996421 | 416826 | 3304 | 54 |
| | 93 | 1002732 | 399856 | 3413 | 52 |
| | 94 | 1482488 | 455959 | | 57 |
| | 95 | 2339852 | 483038 | | 52 |
| Growth | 88-95 | 270.8% | 40.4% | | |

Appendix 2

Comparative Data For Northwest United States

Comparison of Manufacturing Shipments by Industry

| Industry Description | SIC Code | Mont. Shipments | Wash. Shipments | Idaho Shipments | Oregon Shipments | Wyoming Shipments | Utah Shipments | Colorado Shipments |
|----------------------------------|----------|--------------------|--------------------|--------------------|---------------------|----------------------|-------------------|-----------------------|
| Food & Kindred Products | 20 | 451.4 | 8769 | 3244.9 | 4167.3 | 213.8 | 2625.1 | 7417.4 |
| Tobacco Products | 21 | | | | | | | |
| Textile Mill Products | 22 | | D | | 60.1 | | 31.4 | D |
| Apparel and other Textile Produc | 23 | 15.1 | 554.2 | 20.9 | 169.4 | 4.5 | 262 | 325.4 |
| Lumber & Wood Products | 24 | 1111.7 | 6003.3 | 1998.5 | 9516.5 | 142 | 248.1 | 349.8 |
| Furniture & Fixtures | 25 | D | D | D | 279.6 | | 217.6 | 244.5 |
| Paper & Allied Products | 26 | D | 4449.9 | D | 2695.9 | | 467.3 | 446.2 |
| Printing & Publishing | 27 | 176.4 | 1926.3 | 300.7 | 1650 | 67.1 | 805.8 | 2361.9 |
| Chemicals & Allied Products | 28 | 184.3 | 2671.1 | 978.4 | 709.8 | 646.3 | 674.4 | 599.4 |
| Petroleum & Coal Products | 29 | 1111.2 | 4246.5 | | 213.4 | 952.1 | 1474 | 753.6 |
| Rubber & Miscellaneous Plastics | 30 | 15.6 | 896.3 | 68 | 552.4 | D | 227 | 666.4 |
| Leather & Leather Products | 31 | | D | D | 33.2 | | 8.1 | D |
| Stone, Clay & Glass Products | 32 | 135.2 | 910.5 | 105.4 | 470.4 | 68.6 | 391.6 | 874.2 |
| Primary Metal Industries | 33 | D | 2938.8 | | 1576.9 | 17.8 | 1804 | 444.6 |
| Fabricated Metal Products | 34 | 82.4 | 1521.7 | 212.9 | 1185.1 | 68.6 | 880.5 | 1215 |
| Industrial Machinery & Equipment | 35 | 56.6 | 2415.3 | 2025.2 | 2390.6 | 105.8 | 870.6 | 4133 |
| Electronic & Other Equipment | 36 | 43.3 | 1350.1 | 731.3 | 2641.5 | | 637.4 | 1784.4 |
| Transportation Equipment | 37 | 35.5 | D | 168.7 | 1883.8 | D | 2329.3 | D |
| Instruments & Related Products | 38 | 14.8 | 1826.2 | 18.9 | 1621 | | 1159.1 | 3974.4 |
| Miscellaneous Mfg Industries | 39 | 137.1 | D | 73.1 | 390.4 | D | 478.9 | 278.4 |
| Auxiliaries | | | | | | | | |

| Comparison of Employment by Industry Statistics Canada | | | | | | | | |
|---|----------|---------------------|---------------------|---------------------|----------------------|-----------------------|--------------------|-----------------------|
| Industry Description | SIC Code | Mont. Employment | Wash. Employment | Idaho Employment | Oregon Employment | Wyoming Employment | Utah Employment | Colorado employmen |
| Food & Kindred Products | 20 | 2.2 | 36.3 | 16.3 | 23.4 | 0.8 | 11 | 25.1 |
| Tobacco Products | 21 | | | | | | | |
| Textile Mill Products | 22 | | D | | 0.7 | | 0.2 | D |
| Apparel and other Textile Product | 23 | 0.3 | 6.7 | 0.4 | 2.7 | 0.1 | 4.9 | 3.7 |
| Lumber & Wood Products | 24 | 7.5 | 33.4 | 12 | 51.2 | 1.6 | 3.2 | 3.5 |
| Furniture & Fixtures | 25 | D | D | D | 3.1 | | 2.7 | 2.8 |
| Paper & Allied Products | 26 | D | 16.6 | D | 8.4 | | 2.3 | 2.5 |
| Printing & Publishing | 27 | 2.7 | 22.7 | 4.4 | 15.7 | 1.5 | 10 | 24.7 |
| Chemicals & Allied Products | 28 | 0.6 | 14.1 | 4.4 | 2.7 | 1 | 3.2 | 2.9 |
| Petroleum & Coal Products | 29 | 0.9 | 2.5 | | 0.6 | 0.8 | 0.9 | 0.7 |
| Rubber & Miscellaneous Plastics | 30 | 0.2 | 8.5 | 0.7 | 4.7 | D | 2.3 | 5.7 |
| Leather & Leather Products | 31 | | D | D | 0.4 | | 0.2 | D |
| Stone, Clay & Glass Products | 32 | 1 | 6.9 | 1 | 3.7 | 0.7 | 3 | 6.9 |
| Primary Metal Industries | 33 | D | 11.9 | | 10.6 | 0.1 | 6.3 | 2.8 |
| Fabricated Metal Products | 34 | 1 | 11.5 | 2.2 | 11 | 0.4 | 7.4 | 14.7 |
| Industrial Machinery & Equipment | 35 | 0.7 | 19.5 | 7.4 | 17 | 1.2 | 7.4 | 10.4 |
| Electronic & Other Equipment | 36 | 0.7 | 11.3 | 7.6 | 16.3 | | 6.4 | 14.9 |
| Transportation Equipment | 37 | 0.3 | D | 1.7 | 12 | D | 15.2 | D |
| Instruments & Related Products | 38 | 0.2 | 14.4 | 0.3 | 13.1 | | 9.6 | 21.2 |
| Miscellaneous Mfg Industries | 39 | 1.4 | D | 0.7 | 4.1 | D | 5.5 | 3.8 |
| Auxiliaries | | | 9.6 | 4.1 | 10.6 | | 2.1 | 7.3 |

Comparison of Establishments by Industry

| Industry Description | SIC Code | Mont. Establishment | Wash. Establishment | Idaho Establishment | Oregon Establishment | Wyoming Establishment | Utah Establishment | Colorado Establishment |
|---------------------------------|----------|------------------------|------------------------|------------------------|-------------------------|--------------------------|-----------------------|---------------------------|
| Food & Kindred Products | 20 | 114 | 629 | 151 | 433 | 40 | 185 | 342 |
| Tobacco Products | 21 | | | | | | | |
| Textile Mill Products | 22 | | 44 | | 19 | | 18 | 28 |
| Apparel and other Textile Produ | 23 | 33 | 293 | 45 | 158 | 27 | 131 | 210 |
| Lumber & Wood Products | 24 | 481 | 1836 | 644 | 2088 | 128 | 200 | 331 |
| Furniture & Fixtures | 25 | 25 | 252 | 45 | 176 | | 111 | 169 |
| Paper & Allied Products | 26 | 4 | 112 | 10 | 60 | | 32 | 47 |
| Printing & Publishing | 27 | 211 | 1295 | 255 | 921 | 116 | 414 | 1294 |
| Chemicals & Allied Products | 28 | 35 | 208 | 32 | 144 | 26 | 90 | 120 |
| Petroleum & Coal Products | 29 | 7 | 26 | | 22 | 8 | 17 | 24 |
| Rubber & Miscellaneous Plastic | 30 | 15 | 251 | 39 | 204 | 4 | 106 | 205 |
| Leather & Leather Products | 31 | | 34 | 10 | 26 | | 15 | 34 |
| Stone, Clay & Glass Products | 32 | 84 | 319 | 81 | 215 | 41 | 112 | 252 |
| Primary Metal Industries | 33 | 11 | 103 | | 82 | 5 | 48 | 58 |
| Fabricated Metal Products | 34 | 66 | 601 | 99 | 504 | 31 | 252 | 413 |
| Industrial Machinery & Equipme | 35 | 92 | 903 | 174 | 742 | 67 | 292 | 663 |
| Electronic & Other Equipment | 36 | 23 | 291 | 40 | 245 | | 129 | 274 |
| Transportation Equipment | 37 | 35 | 483 | 45 | 223 | 5 | 82 | 120 |
| Instruments & Related Products | 38 | 31 | 248 | 29 | 198 | | 103 | 288 |
| Miscellaneous Mfg Industries | 39 | 80 | 427 | 75 | 298 | 26 | 140 | 298 |
| Auxiliaries | | | 167 | 38 | 105 | | 48 | 126 |

Comparison of Employment by Industry
Statistics Canada

| Industry Description | SIC Code | Mont. | Wash. | Idaho | Oregon | Wyoming | Utah | Colorado |
|-----------------------------------|----------|-------|-----------|---------|---------|---------|------|----------|
| Food & Kindred Products | 20 | 2.2 | 28.3 | 16.3 | 25.4 | 0.8 | 11 | 26.1 |
| Tobacco Products | 21 | | | | | | | |
| Textile Mill Products | 22 | | 10 | | | | | |
| Leather and other Textile Product | 23 | 0.3 | 8.3 | 8.4 | 6.7 | | 0.2 | 0 |
| Chemical and Allied Products | 24 | | 103.35.4 | 38 | 402.3 | | 60 | 430.7 |
| Plastics and Rubber Products | 25 | 3.5 | 63 | 32 | 388.12 | | 100 | 340.5 |
| Nonmetallic Mineral Products | 26 | 0 | 348 | 30 | 480.3.1 | 38 | 403 | 380 |
| Primary Metal Industries | 27 | 0 | 163.16.8 | 48 | 353.4 | 0 | 05 | 350.5 |
| Chemical and Allied Products | 28 | 3.3 | 304.27.7 | 5.3.4.4 | 548.7 | | 458 | 350.7 |
| Chemical and Allied Products | 29 | 0.5 | 600.14.1 | 13.4.4 | 145.7 | | 508 | 410 |
| Chemical and Allied Products | 30 | 0.9 | 204.2.5 | 30 | 104.5 | | 523 | 413.8 |
| Chemical and Allied Products | 31 | 0.2 | 103.2.5 | 6.7 | 65.7 | | 62 | 50.7 |
| Chemical and Allied Products | 32 | 0.1 | 348 | 0 | 510.7 | | 105 | 320.7 |
| Chemical and Allied Products | 33 | 0.1 | 34 | 0 | 50.4 | | 42 | 39.3 |
| Chemical and Allied Products | 34 | 0 | 524.8.6 | 38 | 30.3 | | 100 | 340.5 |
| Chemical and Allied Products | 35 | 0 | 30.11.5 | | 58.6 | | 41 | 34.0 |
| Chemical and Allied Products | 36 | 0 | 508.11.8 | 25 | 194.11 | | 80 | 430.7 |
| Chemical and Allied Products | 37 | 0.7 | 458.19.5 | 522 | 851.7 | | 448 | 430.7 |
| Chemical and Allied Products | 38 | 0.7 | 113.11.3 | 40 | 96.3 | | 85 | 41 |
| Chemical and Allied Products | 39 | 0.3 | 503 | 48 | 138.12 | | 141 | 160 |
| Chemical and Allied Products | 40 | 0.2 | 1838.14.4 | 954 | 3098.12 | | 300 | 204.3 |
| Chemical and Allied Products | 41 | 1.4 | 382 | 40 | 129.1 | | 421 | 510.2 |
| Chemical and Allied Products | 42 | | 44 | 8.8 | 19.1 | | 18 | 30.8 |
| Chemical and Allied Products | 43 | | | | 10.0 | | | |
| Chemical and Allied Products | 44 | 1.4 | 1050 | 101 | 103 | 80 | 102 | 205 |
| Chemical and Allied Products | 45 | | | | | | | |

| Industry Description | SIC Code | Mont. | Wash. | Idaho | Oregon | Wyoming | Utah | Colorado |
|-----------------------------------|----------|-------|-----------|---------|---------|---------|------|----------|
| Food & Kindred Products | 20 | 2.2 | 28.3 | 16.3 | 25.4 | 0.8 | 11 | 26.1 |
| Tobacco Products | 21 | | | | | | | |
| Textile Mill Products | 22 | | 10 | | | | | |
| Leather and other Textile Product | 23 | 0.3 | 8.3 | 8.4 | 6.7 | | 0.2 | 0 |
| Chemical and Allied Products | 24 | | 103.35.4 | 38 | 402.3 | | 60 | 430.7 |
| Plastics and Rubber Products | 25 | 3.5 | 63 | 32 | 388.12 | | 100 | 340.5 |
| Nonmetallic Mineral Products | 26 | 0 | 348 | 30 | 480.3.1 | 38 | 403 | 380 |
| Primary Metal Industries | 27 | 0 | 163.16.8 | 48 | 353.4 | 0 | 05 | 350.5 |
| Chemical and Allied Products | 28 | 3.3 | 304.27.7 | 5.3.4.4 | 548.7 | | 458 | 350.7 |
| Chemical and Allied Products | 29 | 0.5 | 600.14.1 | 13.4.4 | 145.7 | | 508 | 410 |
| Chemical and Allied Products | 30 | 0.9 | 204.2.5 | 30 | 104.5 | | 523 | 413.8 |
| Chemical and Allied Products | 31 | 0.2 | 103.2.5 | 6.7 | 65.7 | | 62 | 50.7 |
| Chemical and Allied Products | 32 | 0.1 | 348 | 0 | 510.7 | | 105 | 320.7 |
| Chemical and Allied Products | 33 | 0.1 | 34 | 0 | 50.4 | | 42 | 39.3 |
| Chemical and Allied Products | 34 | 0 | 524.8.6 | 38 | 30.3 | | 100 | 340.5 |
| Chemical and Allied Products | 35 | 0 | 30.11.5 | | 58.6 | | 41 | 34.0 |
| Chemical and Allied Products | 36 | 0 | 508.11.8 | 25 | 194.11 | | 80 | 430.7 |
| Chemical and Allied Products | 37 | 0.7 | 458.19.5 | 522 | 851.7 | | 448 | 430.7 |
| Chemical and Allied Products | 38 | 0.7 | 113.11.3 | 40 | 96.3 | | 85 | 41 |
| Chemical and Allied Products | 39 | 0.3 | 503 | 48 | 138.12 | | 141 | 160 |
| Chemical and Allied Products | 40 | 0.2 | 1838.14.4 | 954 | 3098.12 | | 300 | 204.3 |
| Chemical and Allied Products | 41 | 1.4 | 382 | 40 | 129.1 | | 421 | 510.2 |
| Chemical and Allied Products | 42 | | 44 | 8.8 | 19.1 | | 18 | 30.8 |
| Chemical and Allied Products | 43 | | | | 10.0 | | | |
| Chemical and Allied Products | 44 | 1.4 | 1050 | 101 | 103 | 80 | 102 | 205 |
| Chemical and Allied Products | 45 | | | | | | | |

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